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telecommunication journal

OFFICIAL ORGAN OF THE INTERNATIONAL TELECOMMUNICATION UNION

Journal des télécommunications
Boletín de Telecomunicaciones

FEBRUARY 1963

Vol. 30 — No. 2

In this issue :

A. KACHEL

The first flight toward Mars

LARRY C. HUNTER and JAMES A. STEWART

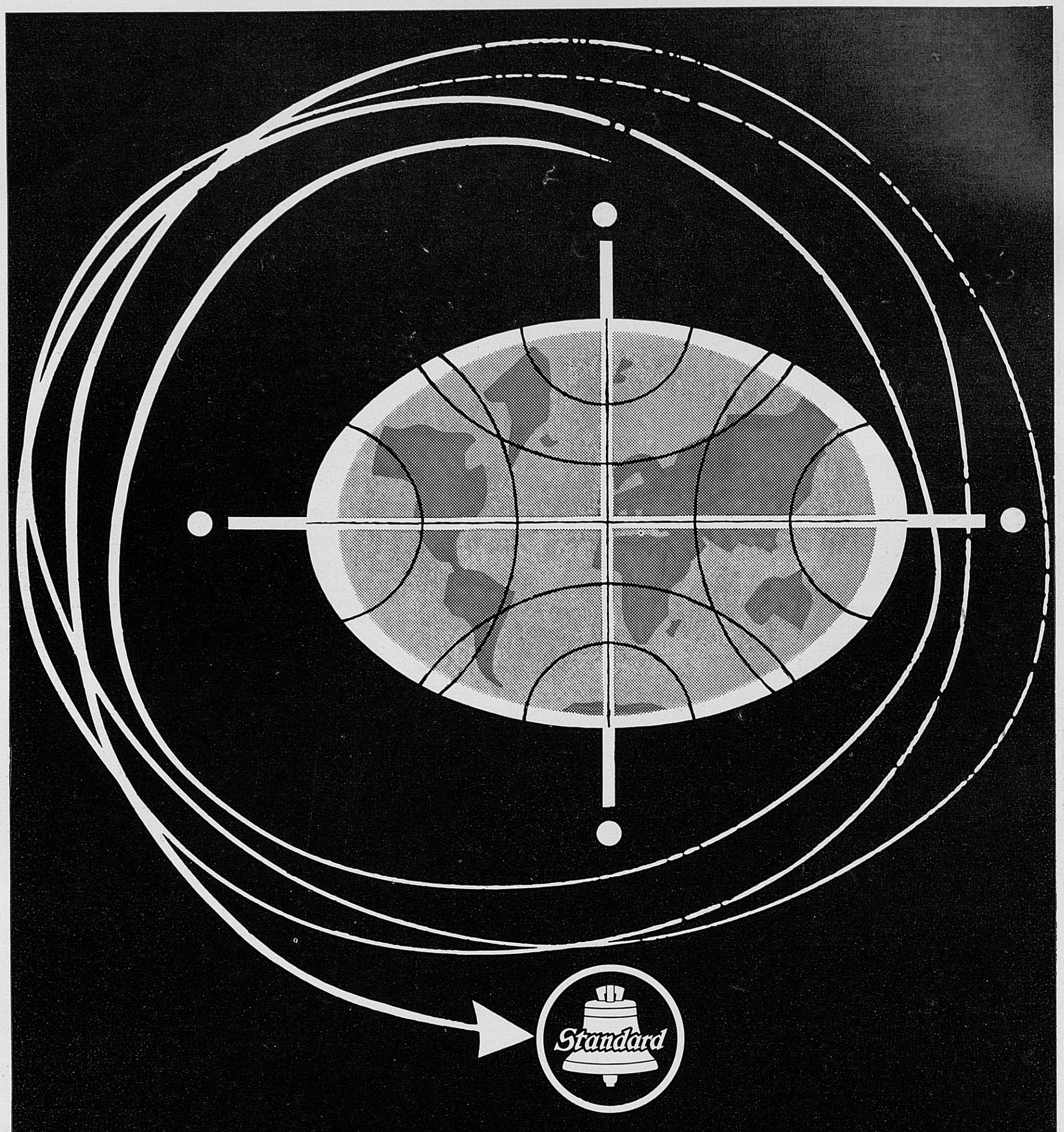
The echo control problem in satellite communications

Telepersonality

No. 26 — Johannes D. H. van der Toorn

RADIO-RELAY SYSTEM TOWER, MORA, SWEDEN →

(Photo : Swedish Administration)



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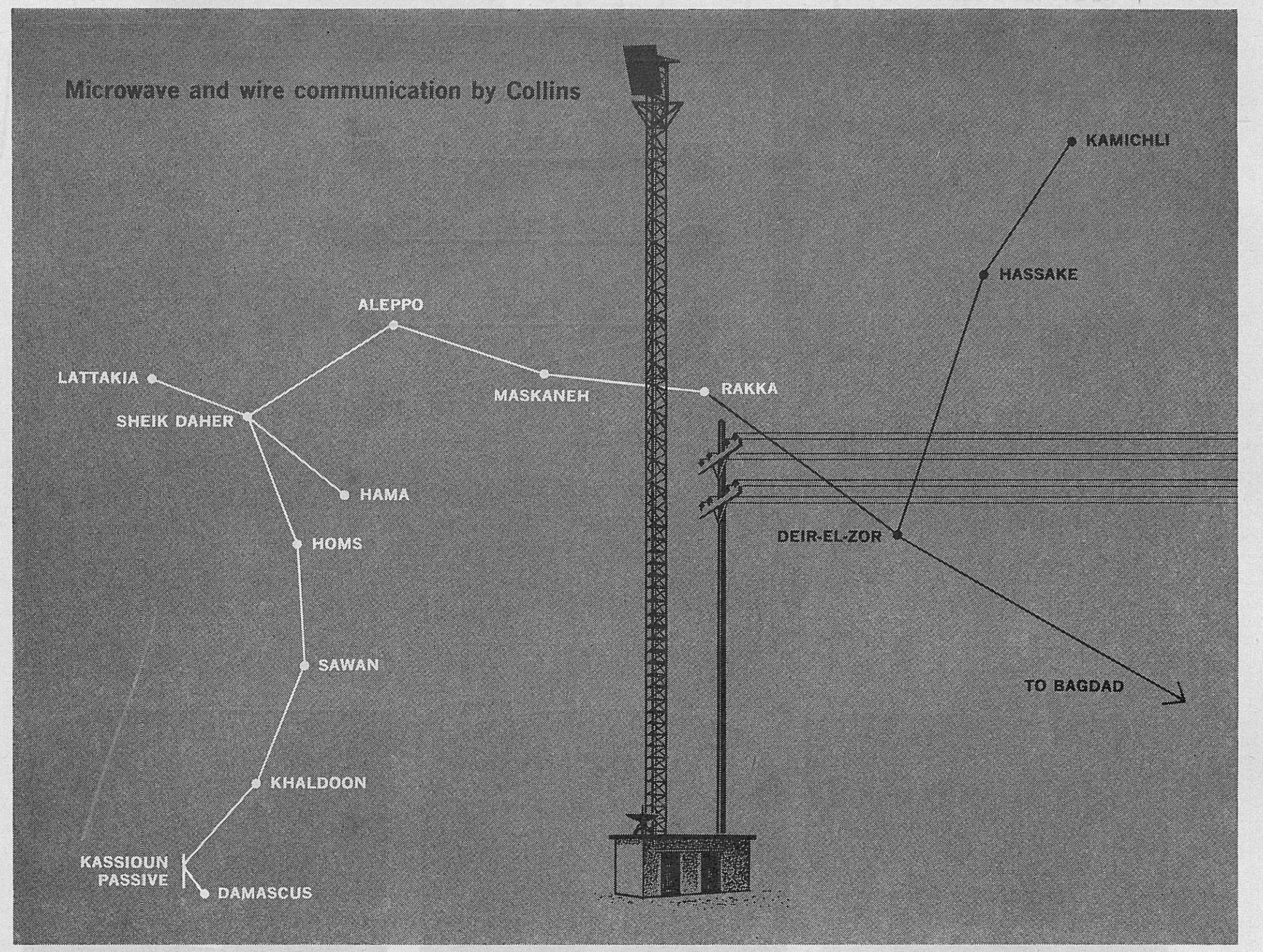


How Syria's new microwave system can help you make an important decision

Flexibility of Collins equipment is the key consideration here.

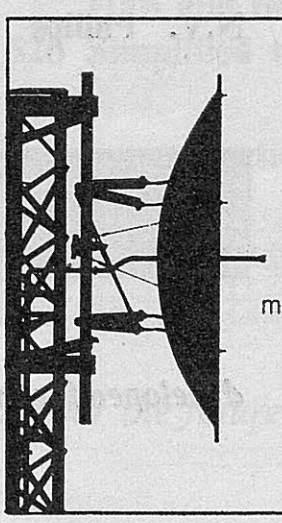
Progress-minded Syria was confronted with a problem not unlike that being faced by many others . . . a pressing need for expanded and more efficient communication facilities. There was the question, too, of how best to use Syria's existing open-wire carrier facilities and how to incorporate them into the system. The solution proposed by Collins could be the basis for answers to expansion problems you may be facing.

First, Syria's present wire line circuits will be reworked to bring this part of the system up to 12-channel carrier capability. These lines will also be used for program and 2-way broadcast channels.

In the more populous areas where heavier density service is required, Collins is installing a microwave system. To simplify interconnection of the microwave with existing open-wire plant, a Collins WMX-106, 12-channel transistorized carrier system will be used. This system can be interconnected at group frequencies (60 to 108 kc, CCITT basic group) with Collins MX-106 (L type carrier) and with other CCITT carrier systems. When the entire installation is completed, cities, towns and villages throughout Syria will, for the first time, be linked together by automatic telephone, telegraph and broadcast service.

If you have an expansion decision to make, or if that decision involves a new communication system, let us show you what Collins equipment flexibility and Collins experience can do for you.

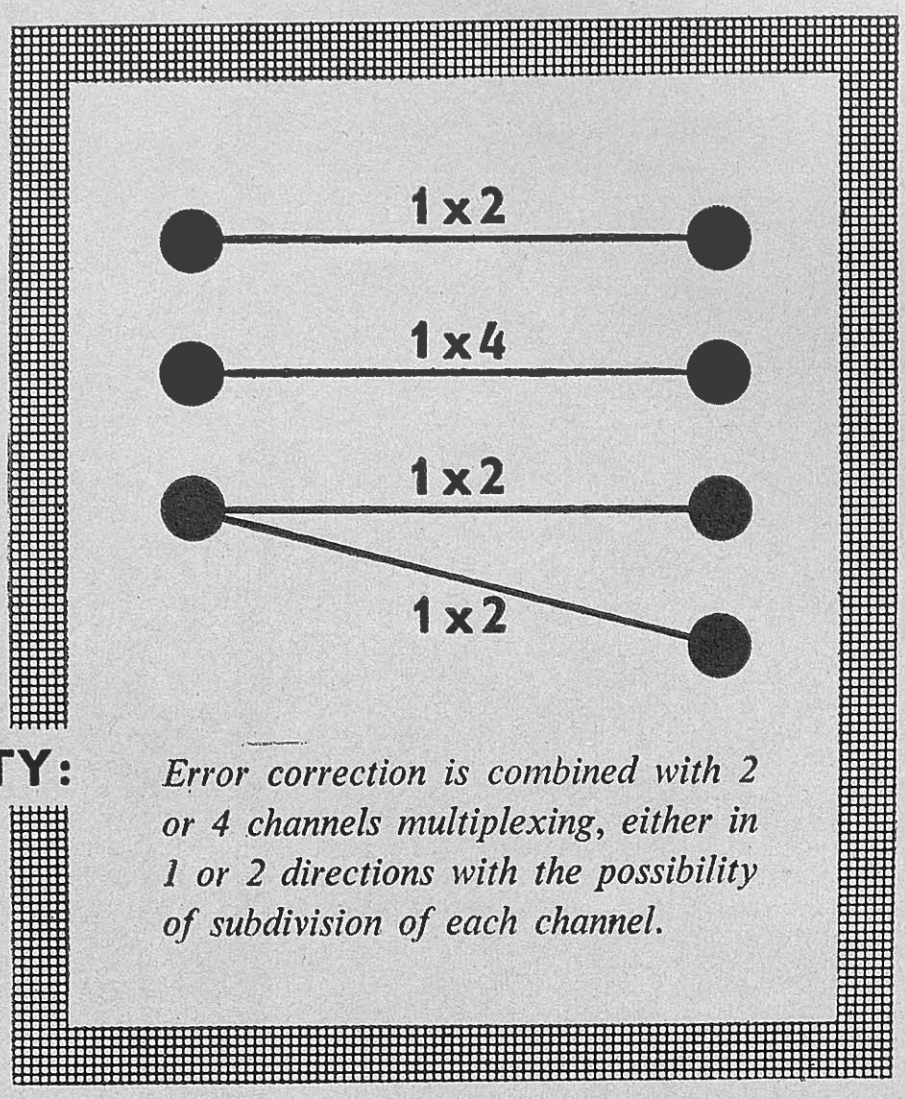
COLLINS RADIO COMPANY • International Division • Dallas, Texas, U.S.A.



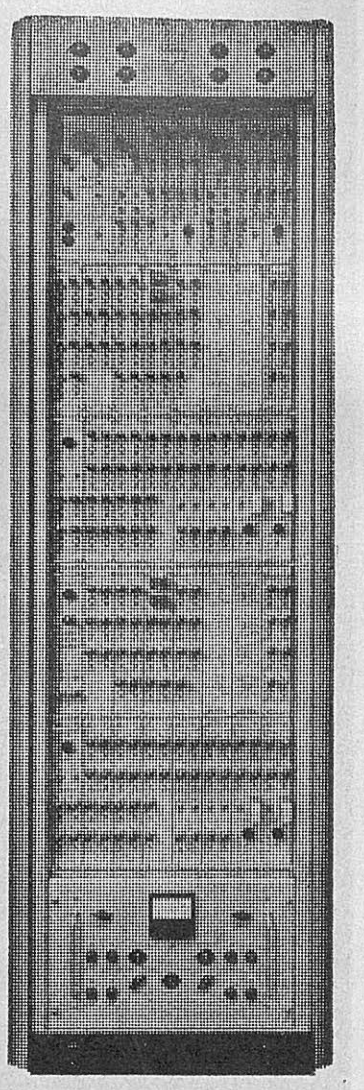
For the world's most complete line of microwave and carrier — Call Collins!

COLLINS

For automatic error detection and correctton in radio-telegraphy:



T.O.R. ADAPTABILITY: *Error correction is combined with 2 or 4 channels multiplexing, either in 1 or 2 directions with the possibility of subdivision of each channel.*



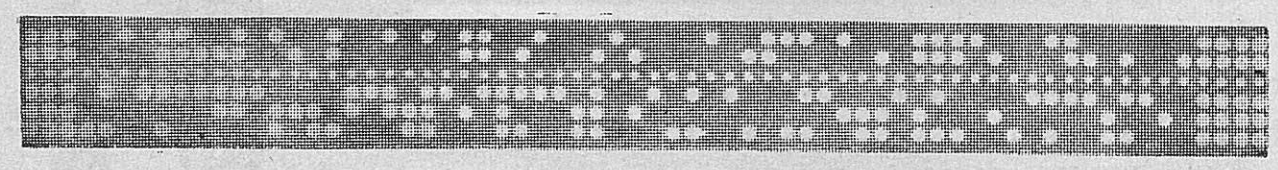
PHILIPS

teleprinting on radio

TOR

Adaptability and economy go hand in hand in Philips full electronic teleprinting-on-radio (TOR) equipment (system Dr. van Duuren). Philips TOR equipment is intended for use on national and international radio links, for public telex and telegraph traffic and on private leased channels. It can be used in conjunction with equipment of other makes provided it meets CCITT recommendations. Further information from Philips representatives of N.V. Philips Telecommunicatie Industrie Hilversum, The Netherlands.

PHILIPS



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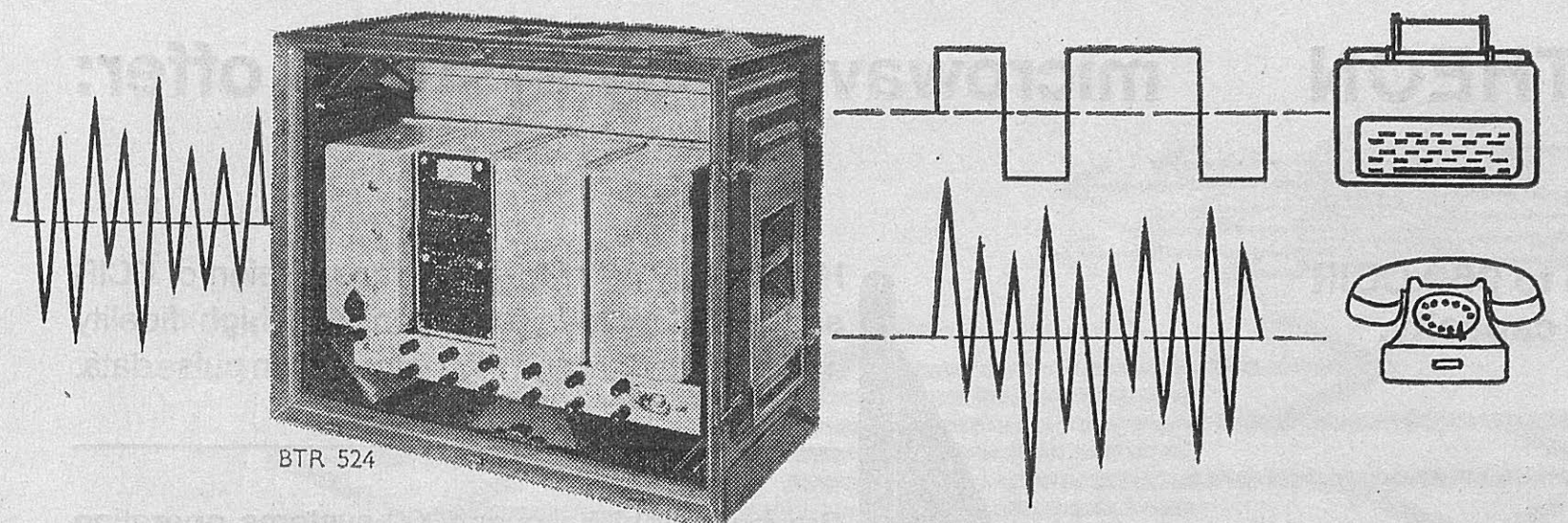
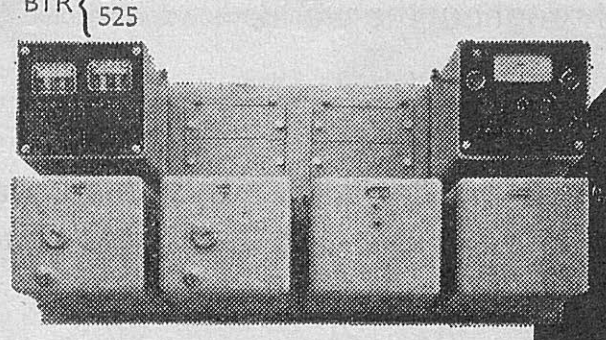
an advertisement from Philips KEY CAPITALS series.

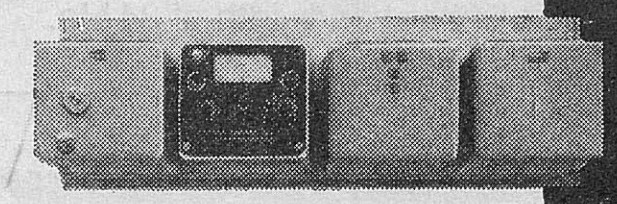


BTR 524

BTR { 515 / 525



BTR 526



FM

Speech plus Duplex Telegraph Systems

Philips speech-plus-duplex telegraph equipment permits full utilisation of any 2 or 4 wire speech circuit by providing one or more reliable fully transistorized duplex telegraph channels in addition to the speech channel.

4-wire circuits

- **BTR 515** one or two AM telegraph channels above the speech band.
- **BTR 525** one or two FM telegraph channels above the speech band.

By-pass filters and branching amplifiers are also available.

2-wire circuits

- **BTR 524** one FM telegraph channel in the middle of the speech band. Telephone VF signalling and ringing included. Half and full duplex teleprinter loops.
- **BTR 526** Simplified version of BTR 524.

N.V. Philips' Telecommunicatie Industrie Hilversum, The Netherlands.

PHILIPS

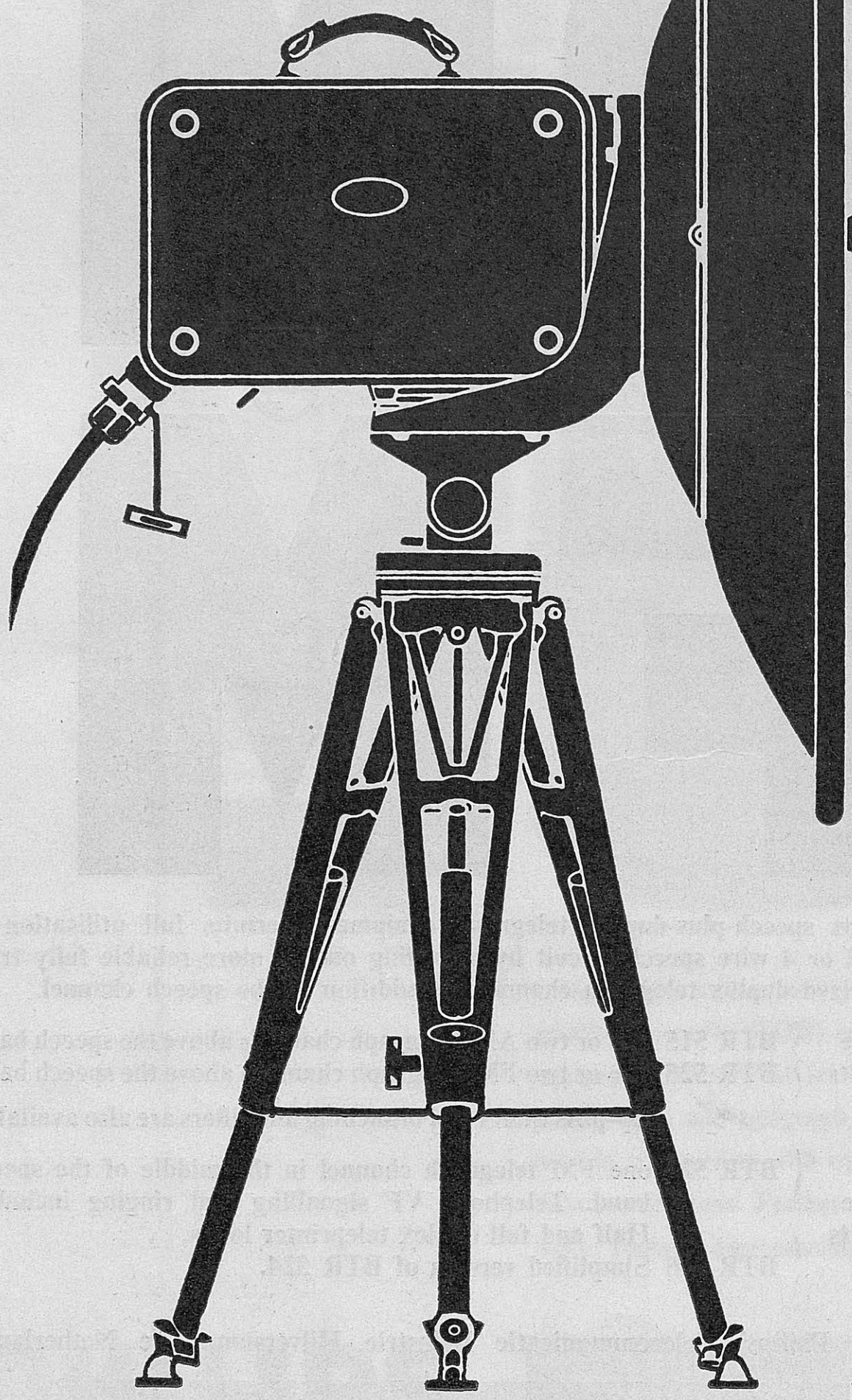
<=PHILIPS FOR TELEGRAPHY EQUIPMENT<=

developed for the future, available now

an advertisement from Philips **KEY CAPITALS** series.

RAYTHEON microwave relay systems offer:

A complete line up to 960 CCIR telephone channel capacity.



High quality point-to-point transmission of CCIR and NTSC colour television with high fidelity audio, radar data and high information pulse data.

Proven reliability: over 1000 systems operating throughout the world.

Maximum flexibility: systems covering the 4 kMc, the 7 kMc and the 11 kMc bands.

IF and limiter bandwidth of 34 Mc.

Thermostatically controlled two speed blower, which temperature stabilizes the transmitter klystron providing high frequency stability without the need of complex AFC circuits.

Built-in temperature compensated reference wavemeters for calibration of transmitter klystrons and receiver local oscillator.

Built-in test and metering facilities.

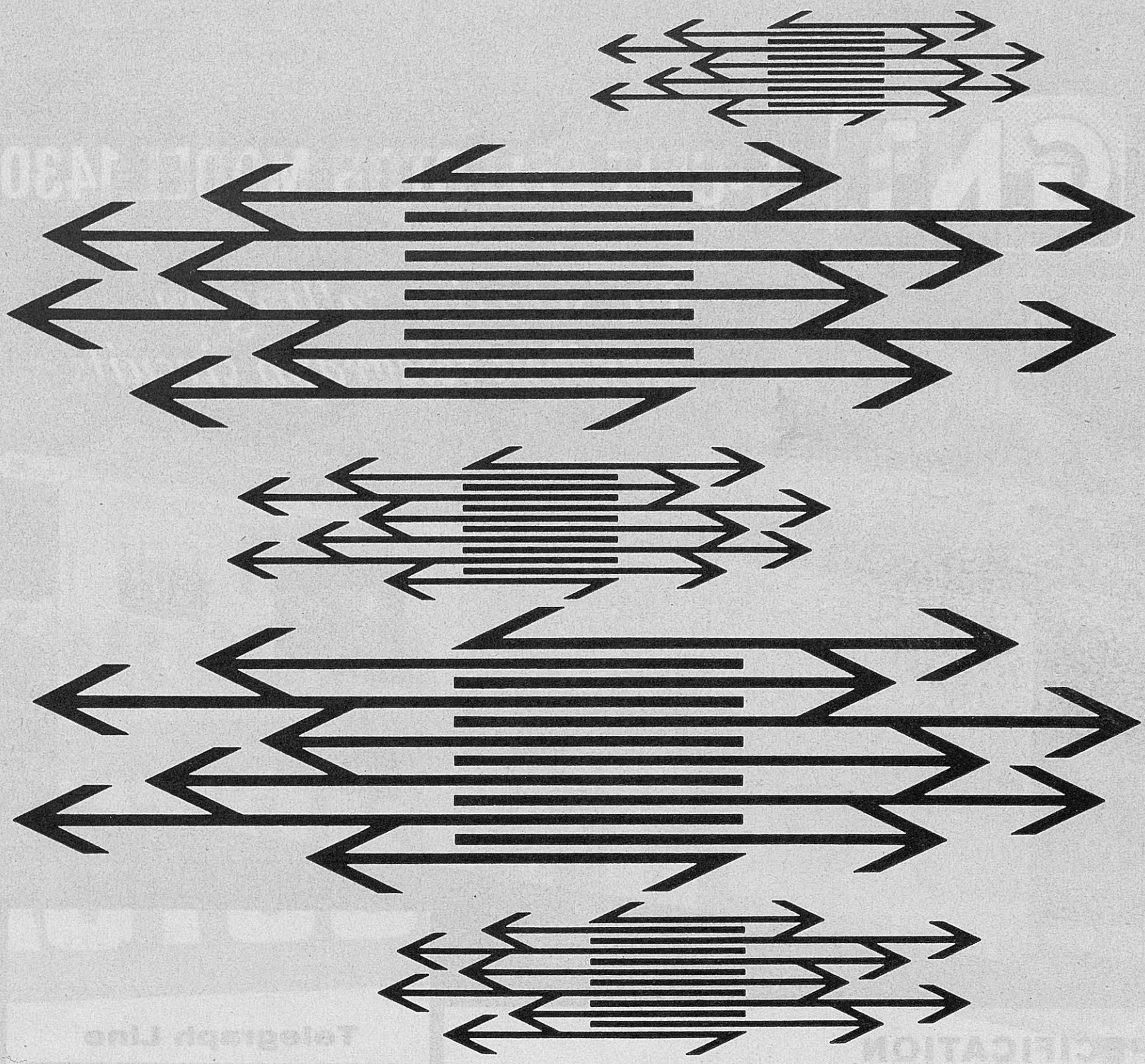
Easy operation and maintenance.

Portable or rackmounted!

Raytheon microwave relay systems have been chosen by various Government Agencies in Europe.

RAYTHEON

Please address your inquiry for more specific information to:
RAYTHEON AG, Alpenstrasse 1, Zug/Switzerland



Teleprinters according to CCITT standards.
CCITT 5-unit No 2 alphabet-emission of 7.5 impulse code combinations and reception of 7, 7.42 and 7.5 impulse code combinations.

Send-receive and receive-only tape printing reperforators.
Keyboard perforators with and without local copy on page.
Tape reperforators.
Automatic tape transmitter attachment.
Single and ganged automatic tape transmitters.
Line units and control boxes.
Frequency-shift V.F. terminals.
Manual and automatic exchanges.

Teleprinters

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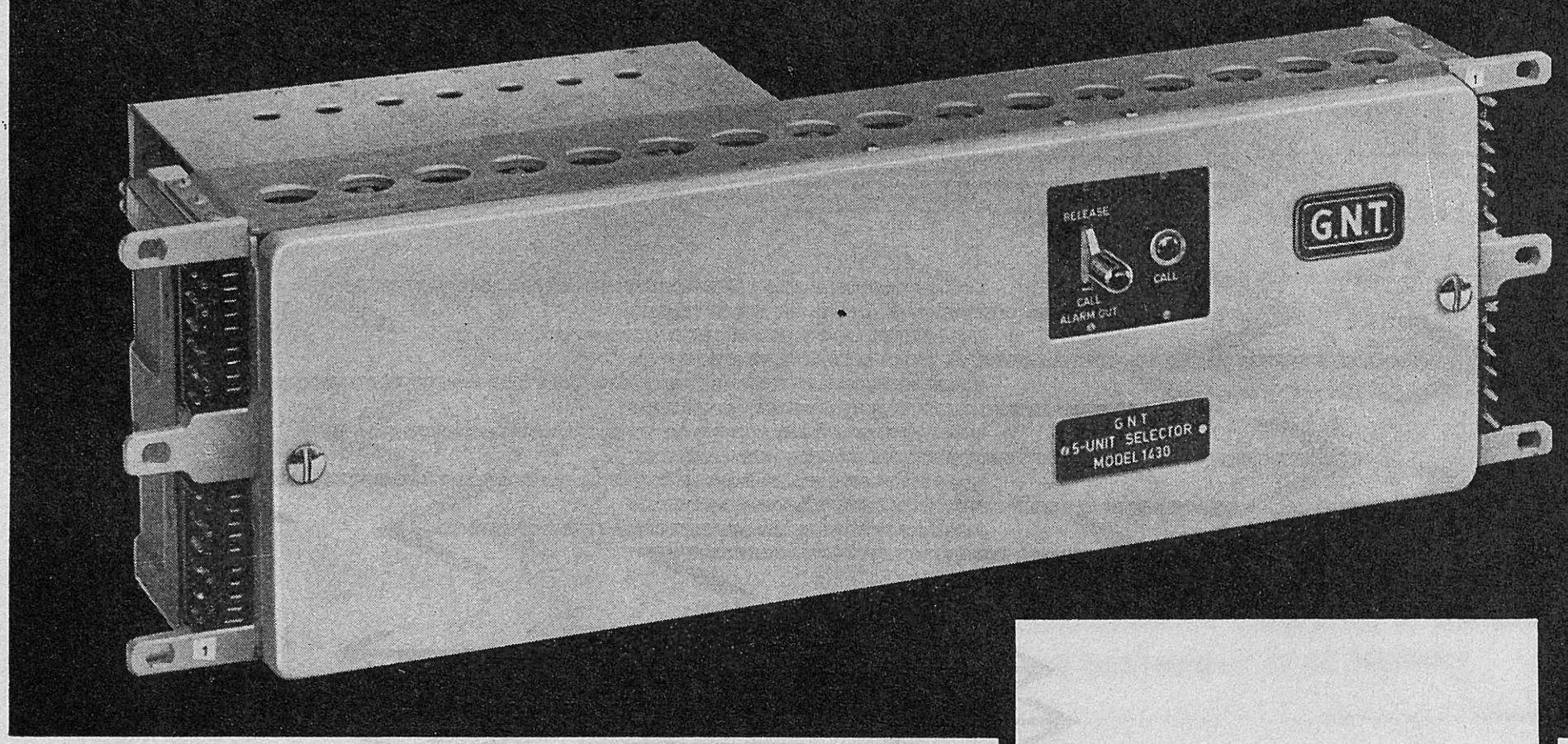
Telex: 2 10 43

G.N.T.

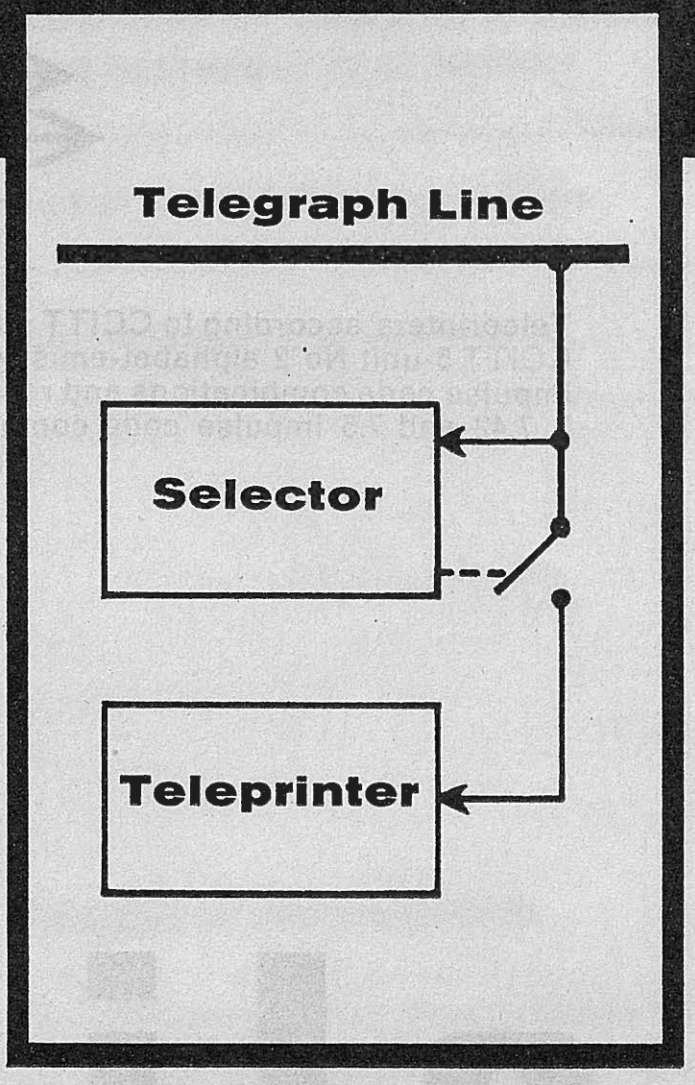
5-UNIT SELECTOR MODEL 1430

For selective calling on omnibus telegraph circuits



SPECIFICATION

- Input signal speed 50 bauds, other speeds on request
- Accepts incoming signals having as much as 45% distortion
- Start polarity plus or minus 60 to 80 volts
- Available for double current, or, if requested, single current
- Responds to call signals consisting of up to 7 characters, for instance ZZZZ... or ZCZC... where Z and C may be any character of the 5-unit alphabet
- Complete unit, including plug-in printed circuits, mounted in 5 1/4" panel (51-type New Equipment Practice - G.P.O. Standard) thus facilitating easy installation and maintenance

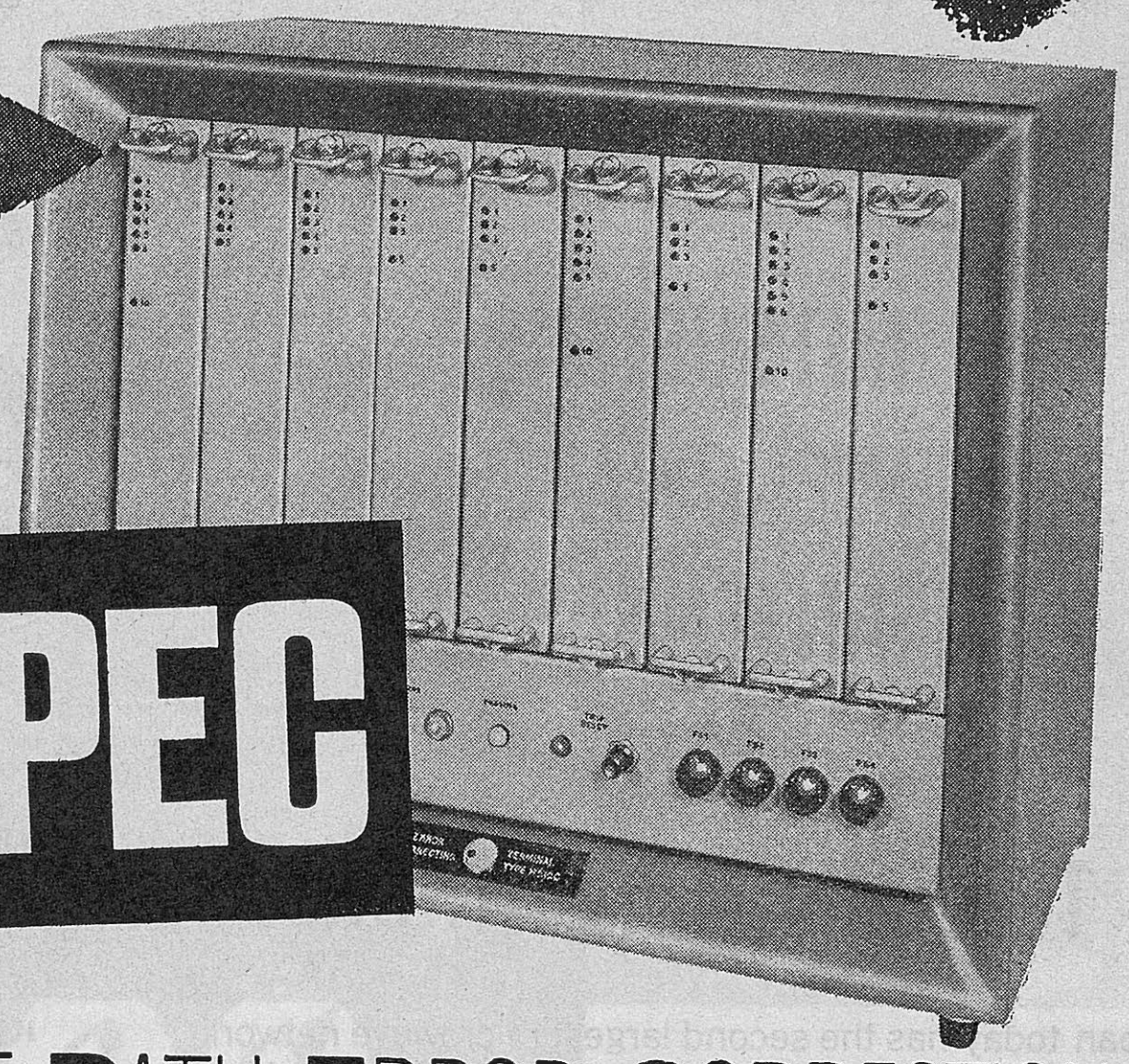


GREAT NORTHERN TELEGRAPH WORKS

SYDHAVNS PLADS 4 · COPENHAGEN SV · DENMARK
LONDON OFFICE: 5, ST. HELEN'S PLACE, LONDON E.C.3

LOW BUDGET
ERROR PROOF TELEGRAPHY

with the **NEW**
MARCONI
AUTOSPEC



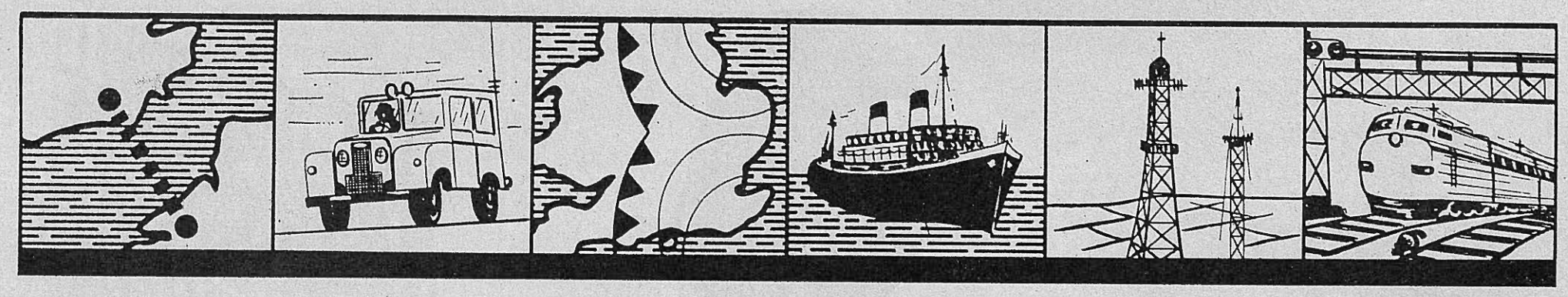
AUTOMATIC SINGLE PATH ERROR CORRECTION

- **RUGGED**
- **UNATTENDED OPERATION**
- **SOLID STATE** ● **LOW COST**
- **COMPACT** ● **SIMPLE**
- **NO MODIFICATION TO EXISTING INSTALLATIONS**

AUTOSPEC provides error proof telegraph working on services where no return path is required or on low capacity point-to-point circuits

AUTOSPEC is the first single path error corrector to include automatic correction without the need for repetition

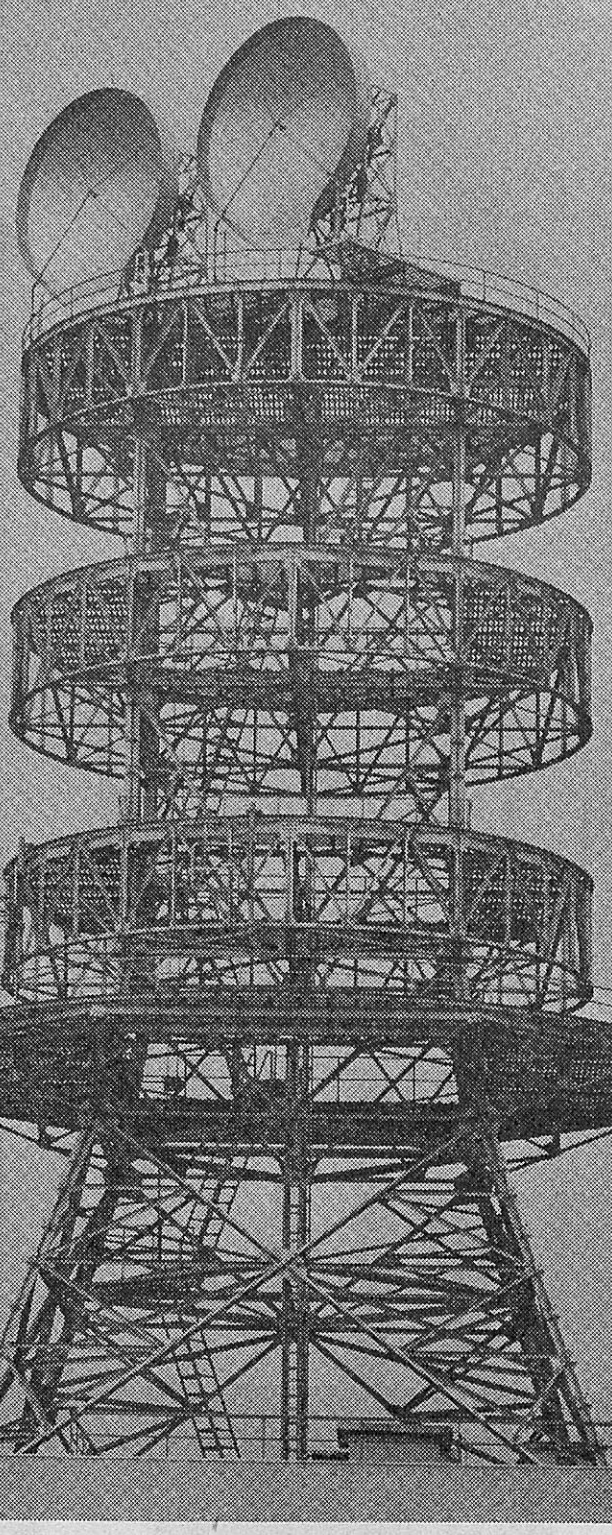
AUTOSPEC is a product of the same design team responsible for the production of the world famous AUTOPLEX



MARCONI'S WIRELESS TELEGRAPH CO. LIMITED · CHELMSFORD · ESSEX · ENGLAND

H9

MITSUBISHI MICROWAVE ANTENNAS FOR TELECOMMUNICATIONS



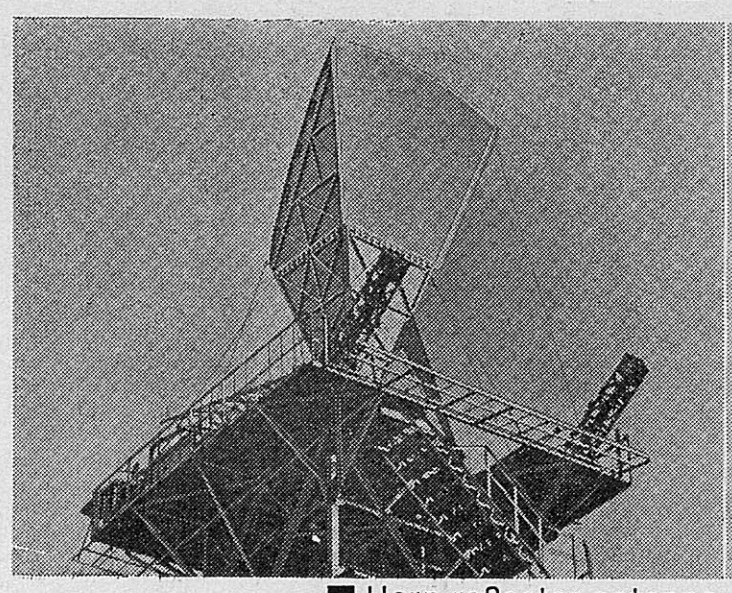
Japan today has the second largest microwave network in the world. Mitsubishi Electric, with the longest microwave antenna experience in Japan, has supplied 90% of the antennas used in the trunk lines of this extensive network. Mitsubishi antenna systems include parabolic, scatter, horn reflector and radar types, as well as a complete line of waveguide components and accessories. Frequencies from 900 Mc. to 24 KMc. are covered. The IU-61, shown above and specified at the right, is typical of the outstanding performance of Mitsubishi microwave antennas. Full technical information on any of these types of antennas is available at your request.

IU-61 6000 Mc. Band Parabolic Antenna

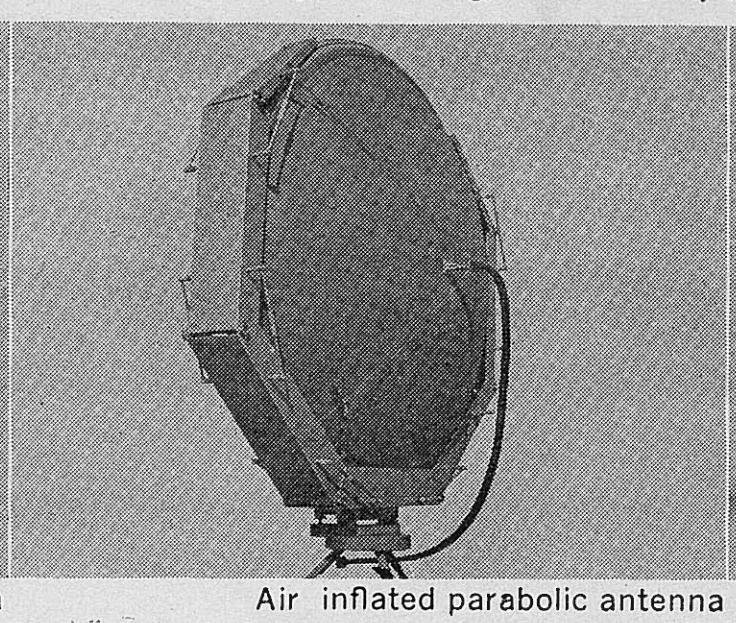
Diameter	: 4 meters
Frequency Range	: 5925~6175 Mc/s or 6175~6425M c/s
Feed System	: Dual circularly polarized wave
Gain	: 45 db
Beam Width	: 0.98 degrees (half power)
First Side Lobe	: −23 db
Wide Angle Radiation (over 60 degrees)	: −60 db
Front-to-Back Ratio	: 65~70 db
VSWR	: 1.02
Ellipticity Ratio	: 1.1 (power axial ratio)
Discrimination of anti-circularly polarized wave	: −30 db
Coupling of Both Arms	: −35 db
Guaranteed for Wind Velocity of	: 60 meters/second
Weight	: 800 kilograms

MITSUBISHI ELECTRIC MANUFACTURING COMPANY

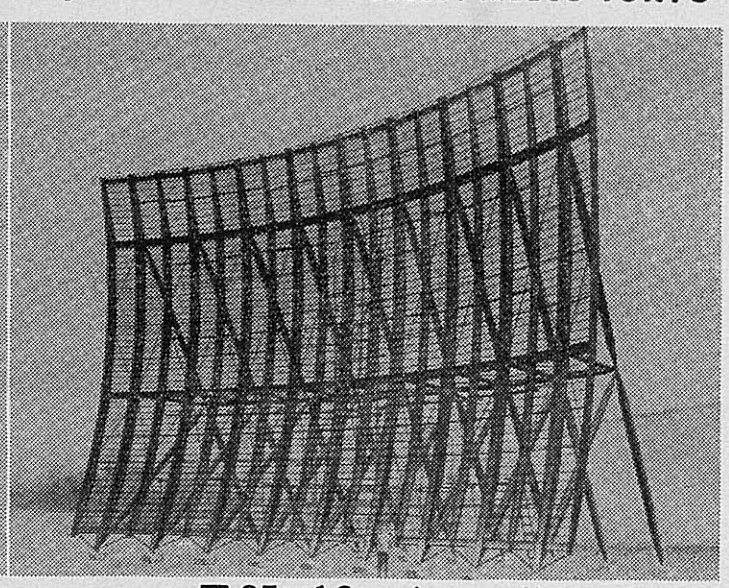
Head Office: Tokyo Building, Marunouchi, Tokyo Cable Address: MELCO TOKYO



■ Horn reflector antenna



Air inflated parabolic antenna



■ 25×16 meter scatter antenna

THE MOST OUTSTANDING ADVANCE IN TELEPRINTER DESIGN IN RECENT YEARS

THE ALL-NEW

creed

MODEL

SEVENTY-FIVE

TELEPRINTER

This is the new Creed Model Seventy-five Teleprinter. First of an entirely new generation of multi-purpose printing telegraph equipment, it is outstanding for its small size, light weight, technical specification and performance.

The Seventy-five is no prototype. It is a fully-engineered machine, field tested under all kinds of conditions.

Now in full-scale production, it is being delivered in quantity for service in some of the most advanced and exacting communications and data processing installations the world over.

A host of significant new features and facilities have been built into the Seventy-five. Here are some of its highlights:

- *typewriter-size and weight with modern appearance.*
- *multi-speed options (available for 60, 66, 75 or 100 words per minute).*
- *aggregate motion selection for smooth, low-stressed, continuous operation with reduced maintenance.*
- *stationary paper carriage and moving typehead.*
- *exclusive dual-purpose friction/sprocket-feed platen.*
- *perfect printing visibility — two-colour printing available.*
- *reliable operation in non-level positions (mobile installations — aircraft, ships, trucks, etc.).*
- *choice of 3- or 4-row keyboards with scores of layouts and coding arrangements.*
- *reperforating attachment for on/off-line paper tape punching* (can be fitted to both keyboard and receiver-only models).
- *adaptability to five-wire parallel (simultaneous) working for data processing, automated control systems and other special applications.*

The Seventy-five is the product of imaginative design and modern manufacturing facilities, backed by over 50 years' experience devoted exclusively to printing telegraphy.

Further information about this outstanding new machine is yours for the asking. A letter, telex or telephone call will bring you comprehensive data without obligation.

Creed & Company Limited

TELEGRAPH HOUSE · CROYDON · ENGLAND

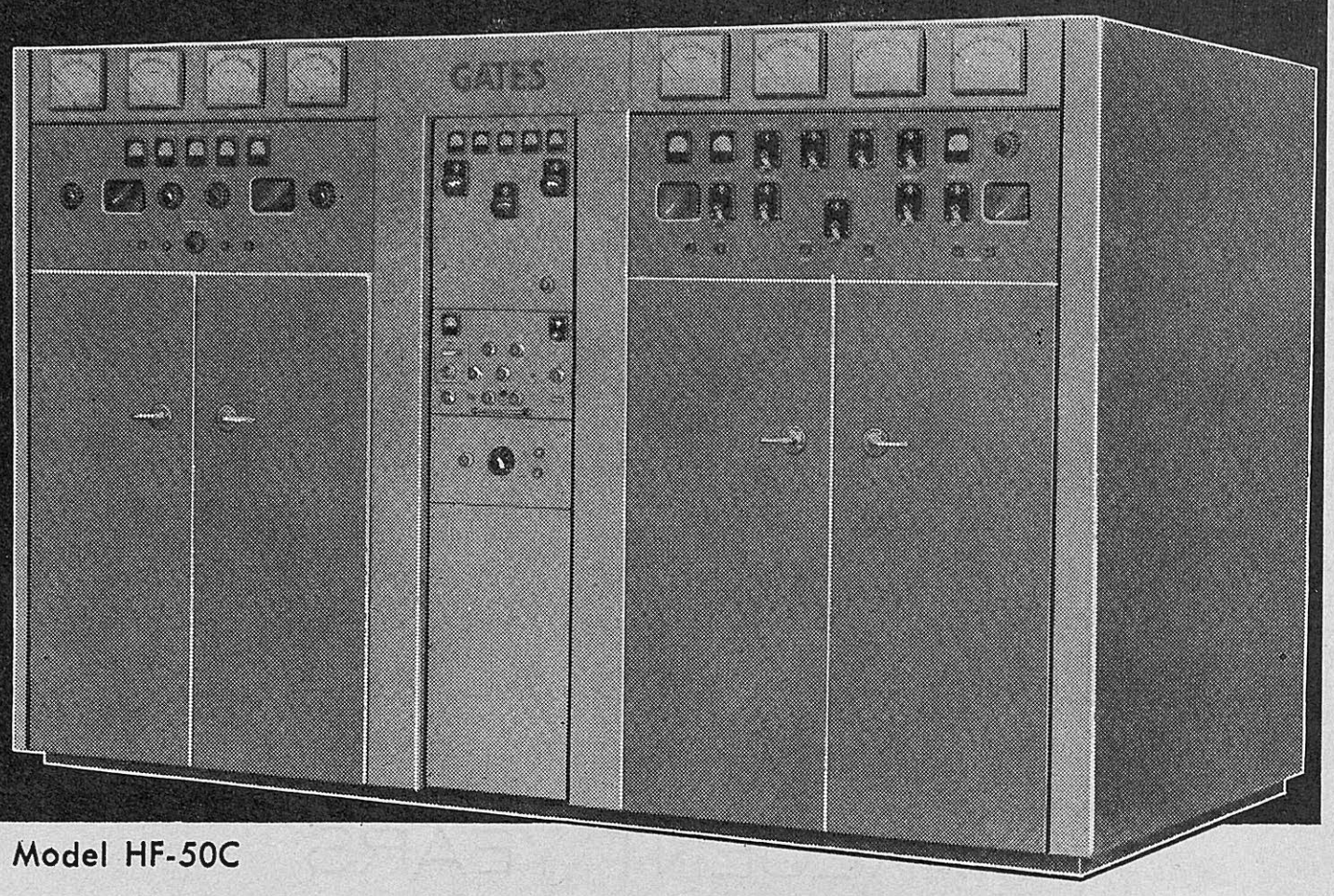
MUNICIPAL 2424 TELEX 28836

AN ITT ASSOCIATE

No. 16783

NOW! NEW HIGH POWER GATES TRANSMITTERS

A complete line of Short Wave and Medium Wave Transmitters including: 1 KW, 5 KW, 10 KW, 20 KW, 50 KW and 100 KW, especially designed to withstand the extremes of all world climates and the most rigorous demands of continuous duty. Every modern technical advance has been incorporated in the design of these superior transmitters. Compact size, rapid frequency change, interchangeability of PA and modulator tubes, longer tube life, and low power consumption.



Model HF-50C

6 REASONS WHY

the GATES High Power Transmitters give you More for Your Money... and Save You More Money!

- **Internal or External Blowers — 100% cooling.**
- **Filament voltages for the entire transmitter are regulated, keeping filament voltage within ½% at all times.**
- **14 meters are provided for convenient, continuous observation of all important circuits.**
- **Band Switching — a new concept of plate tank circuit design permits all adjustments to be made from the front panel in less than 5 mintues.**
- **Interchangeability of the 6804 power amplifier and modulator tubes, reduces spare tube inventory.**
- **Transmitter occupies ONLY 92½ square feet of floor space.**

. . . priced lower than any comparable transmitters!

Imaginative engineering, improved design and new manufacturing methods, characteristic of GATES, have effected tremendous savings — in both initial cost and maintenance. Greatly reduced in size, due to the introduction of Silicon Dry Rectifiers replacing the old High and Low Voltage Rectifier Tubes, assuring almost unlimited life, rugged and dependable performance. Complete tuning is simple and rapid. No plug-in coils are used in 50 and 100 KW models and frequency change can be accomplished in less than five minutes. Many other unique features make these transmitters the most outstanding High Power units available anywhere at any price.

Now in use in about 75 countries around the world, these transmitters have won widespread acceptance and recognition thanks to their uniquely reliable service and economy. The long list of users includes major governments throughout the world, as well as international trans-oceanic radio communications and press services.

For nearly forty years, GATES has been a leader in electronic communications. The prime reason for GATES' popularity everywhere is that while maintaining the highest standard of quality, GATES' equipment is always competitively priced — and equally important — costs less to install and operate. Why not write today for descriptive literature on this modern GATES equipment?

GATES RADIO COMPANY

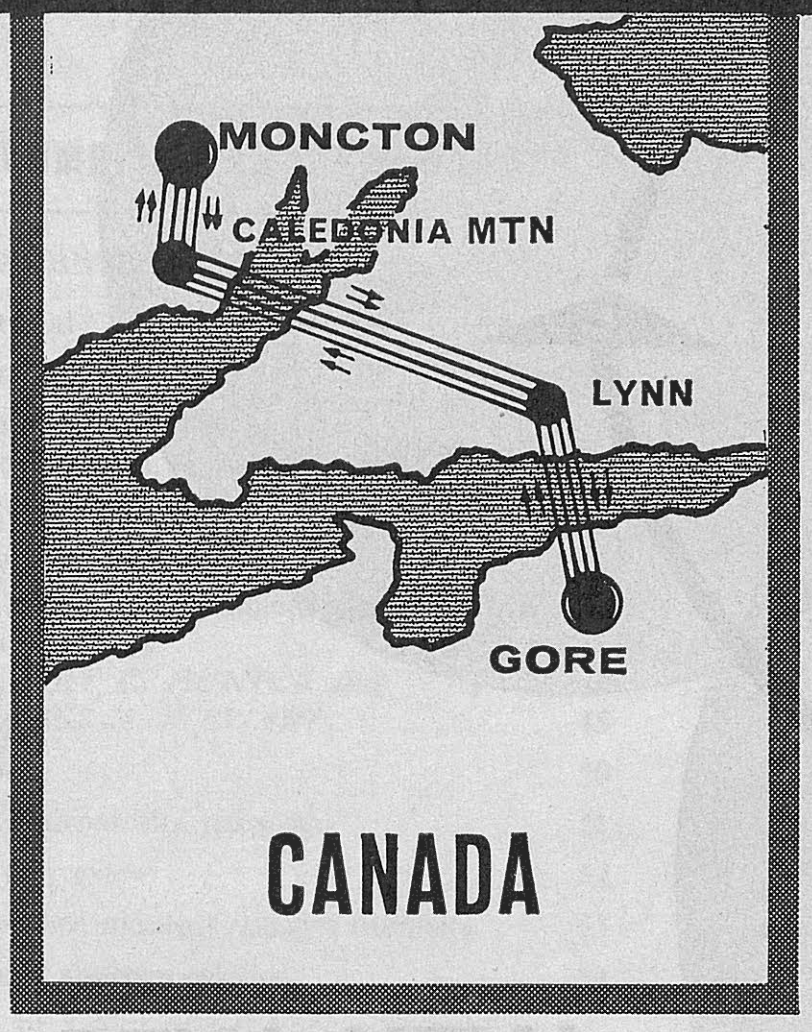
Exclusive International Representative

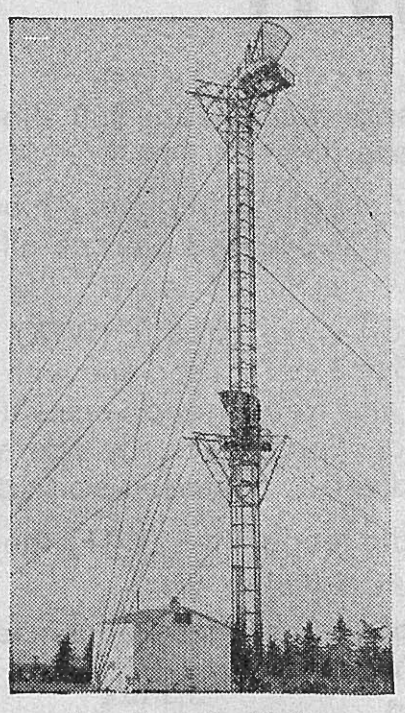
ROCKE INTERNATIONAL CORPORATION

13 East 40th Street, New York 16, New York, U.S.A. Cables ARLAB

G.E.C.

SHF BROADBAND RADIO LINKS





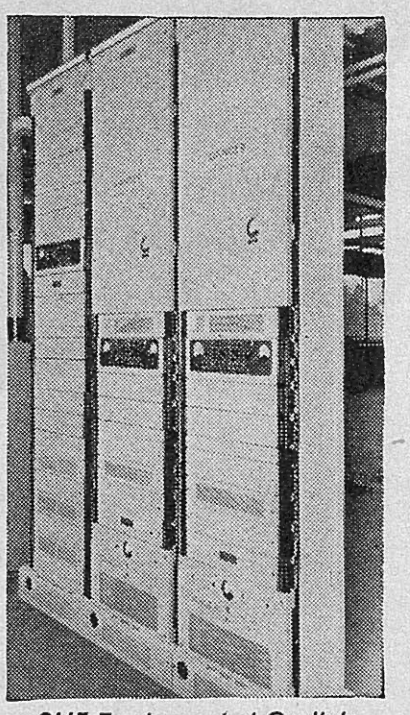
Lynn Repeater Station in Canada

The first two radio relay systems to use G.E.C.'s 6000 Mc/s equipment went into service during August. The first of these is in Canada and provides two bothway radio channels between Moncton in New Brunswick and Gore in Nova Scotia. The link is part of an extensive microwave network being developed by The New Brunswick Telephone Company and the Maritime Telegraph and Telephone Company. The radio and multiplexing equipments were manufactured by The General Electric Co. Ltd., of England and supplied and installed by Canadian General Electric Company.

The other system provides two television channels between Carlisle and Kirk O' Shotts, near Glasgow, and was manufactured and installed by G.E.C. for the British Post Office. Both systems include two intermediate repeater stations.

The equipment in both systems is G.E.C.'s SHF broadband radio equipment which is suitable for both telephony and television applications, conveying either 960 speech circuits or a television circuit on each RF channel. Automatic changeover to a standby channel is effective in the event of failure or undue degradation of the working channels. The equipment conforms to the latest CCIR recommendations.

For further information on the radio and multiplexing equipments, please write for standard specifications, SPO 5555 and SPO 1372.



SHF Equipment at Carlisle Terminal Station

commissioned and now operating . . .

EVERYTHING FOR TELECOMMUNICATIONS

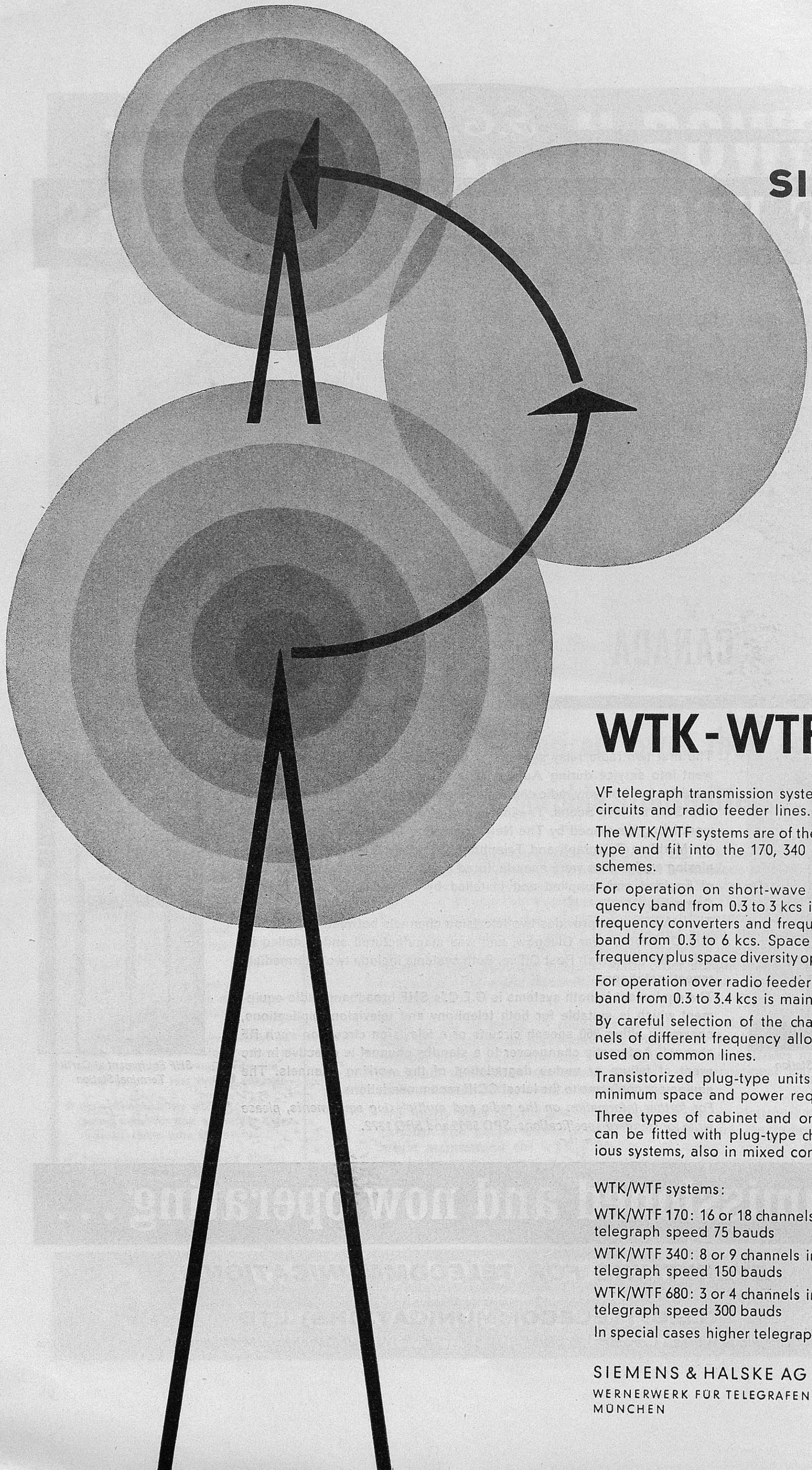
Transmission Division

G.E.C. (TELECOMMUNICATIONS) LTD

Telephone Works · Coventry · England

Works at Coventry and Middlesbrough

Smee's 120



SIEMENS

WTK-WTF

VF telegraph transmission systems for SSB short wave circuits and radio feeder lines.

The WTK/WTF systems are of the frequency-modulated type and fit into the 170, 340 and 680 cps allocation schemes.

For operation on short-wave circuits (WTK) the frequency band from 0.3 to 3 kcs is used and with built-in frequency converters and frequency diversity units the band from 0.3 to 6 kcs. Space diversity operation or frequency plus space diversity operation is also possible.

For operation over radio feeder lines (WTF), the speech band from 0.3 to 3.4 kcs is mainly used.

By careful selection of the channel frequencies, channels of different frequency allocation schemes can be used on common lines.

Transistorized plug-type units meet the demand for minimum space and power requirements.

Three types of cabinet and one desk-mounting case can be fitted with plug-type channel units of the various systems, also in mixed combination.

WTK/WTF systems:

WTK/WTF 170: 16 or 18 channels in speech band, telegraph speed 75 bauds

WTK/WTF 340: 8 or 9 channels in speech band, telegraph speed 150 bauds

WTK/WTF 680: 3 or 4 channels in speech band, telegraph speed 300 bauds

In special cases higher telegraph speeds are tolerable.

SIEMENS & HALSKE AG

WERNERWERK FÜR TELEGRAFEN- UND SIGNALTECHNIK
MÜNCHEN

122-10-41

telecommunication journal

Journal télégraphique (1869-1933)
57 volumes published

Telecommunication Journal (since 1934)
Volume 30

Published monthly by the International Telecommunication Union (ITU) in separate English, French and Spanish editions

VOLUME 30 • No. 2 • FEBRUARY 1963

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SUBSCRIPTION RATES: For all countries: Editions in three separate languages: English, French, Spanish. 20 Swiss francs yearly for one language edition, 30 francs yearly for two and 40 francs yearly for three separate language editions. Single copy: 2 francs. For all information please apply to the Editorial Office: Place des Nations, GENEVA (Switzerland), Telephone (022) 34 80 00 and 34 70 00. Telegraphic address: BURINTERNA. Postal-cheque account: Geneva I 50. Bank account: Société de Banque Suisse, Geneva.
Advertising: Annonces-Service Post S. A. Wydäckerring 140, Zurich 9/47. (Telegraphic address: ANNONCENSERVICE ZURICH.) Postal-cheque account: Zurich VIII 8071. Bank account: Union Bank of Switzerland, Zurich.

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STRENGTHENING OF RADIO LINKS BETWEEN NATIONS

For about a fortnight now the delegates of some fifty countries of the Union have been carrying on their discussions on " .....technical and operating questions relating specifically to radiocommunication..... " organized by the International Radio Consultative Committee (CCIR). However, the dry language of the Convention conceals more than one technical miracle which bygone generations could imagine only in their dreams. Speaking of miracles, one thinks not only of the ventures in space communications which have enabled pictures in monochrome and in colour to be transmitted across the seas but also of all the improvements which have been made in radio technique, such as automatic error correctors in radiotelegraphy, methods of receiving radio messages covered by noise and the propagation of waves by reflexion from ionizing columns created by meteorites. These are but a few cases worthy of mention among the progress which has been accomplished.

All these achievements constitute not only technical miracles, but they also have a profound influence on human life. From the day, some fifty years ago, when for the first time a radiotelegraph signal crossed the ocean, thousands of radiocircuits have covered the earth with an immense cobweb, reducing distances between continents and between nations. It is to be hoped that the technical bringing together resulting from the growth of radiocommunications will help to ensure for the whole world a future rich in mutual understanding.

It is in this spirit and with the determination to work for the achievement of such a future that CCIR has met in Geneva.

M. J.

headquarters

CCIR'S Xth PLENARY ASSEMBLY OPENS

More than 450 delegates in Geneva

The Tenth Plenary Assembly of the International Radio Consultative Committee (CCIR) opened at Geneva's Bâtiment Electoral on Wednesday, 16 January. It will last until 15 February.

Among the dignitaries present at the opening meeting were Mr. Gustav-Adolf Wettstein, President of the Directorate General of the Swiss PTT, representing the Swiss Federal Council ; Mr. Jean Treina, Vice-Chairman of Geneva's Conseil d'Etat, and Mr. Albert Dussoix, Mayor of Geneva.

The first action of the Assembly was to elect Dr. Federico Nicotera, Central Director of International Telecommunication Relations in the Italian PTT, as its Chairman. Three Vice-Chairmen were also elected. They are Mr. José Hernández, of Mexico, Mr. K. Kozlowski, of Poland, and Mr. H. Uyeda, of Japan.

The Assembly then heard speeches by Dr. Nicotera, Mr. Wettstein, Dr. E. Metzler, Director of the CCIR, and Mr. Gerald C. Gross, Secretary-General of the ITU.

Dr. Nicotera, in speaking of the CCIR, said:

« The results obtained by the CCIR during the first thirty-five years of its existence are due to exemplary co-operation between the Member countries of the ITU and its experts. They have required considerable financial contributions by administrations and considerable contributions in work and talent by the experts. The present activities of the CCIR are wider and more difficult than in the past and the present Plenary Assembly is perhaps the most important of all those which have been held so far."

Mr. Wettstein read a message from Mr. Willy Spühler, President of the Swiss Confederation and Head of the Department of Posts and Railways in which he said:

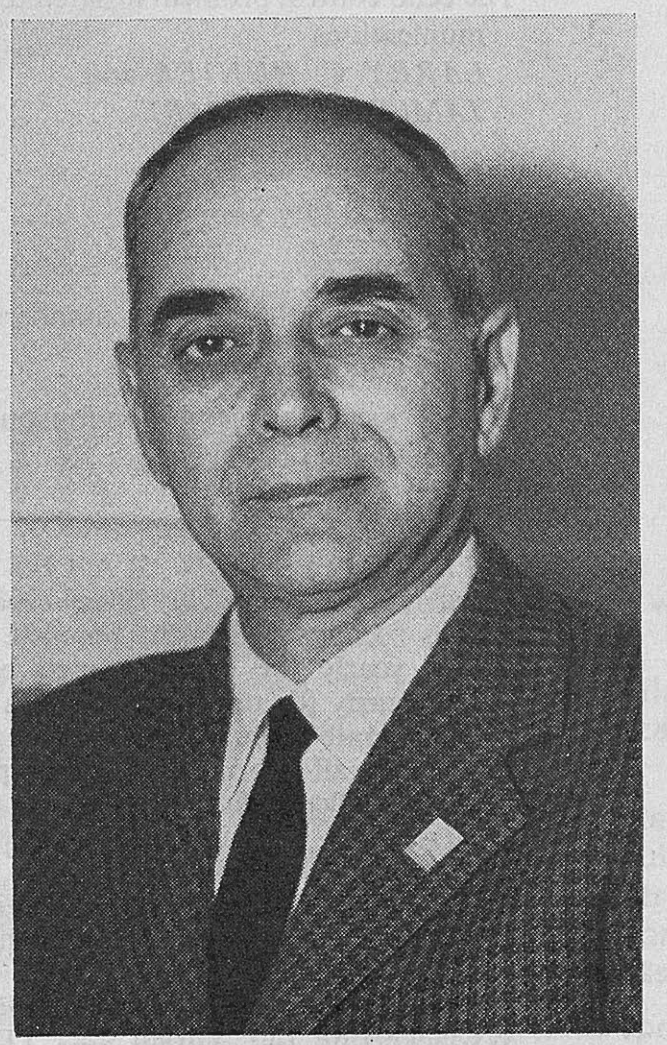
" After an interval of twelve years, special circumstances have led to your return to Geneva, seat of the International Telecommunication Union, and seat of your permanent Secretariat, to hold there one of the most important meetings in the history of your organization. In fact, your work will be undertaken almost on the eve of a conference which will deal, this autumn, also in the City of Geneva, on a world-wide level, with questions concerning the use of the frequency spectrum for space communications. In aiding the progress of scientific knowledge in this field, you will be establishing the main heads of an international understanding which will contribute to a great extent in opening to mankind the thoroughfares of space, under the sign of fruitful collaboration."

Dr. Metzler spoke at length of space communications and then summed up the general situation by saying:

" In general, scientific and technical progress is putting humanity to a severe test. In this sphere the ITU is doing its best by systematically seeking solutions to the problems with which it is faced. Although the work in connection with space communications is entrusted to one of our Study Groups, you know that many of the other CCIR Study Groups can also contribute. Hence you must not feel that the present Plenary Assembly is entirely centred on space communications. In fact, all our Study Groups will have a considerable amount of work to do and will be dealing with all telecommunication questions which call for study at international level."

Mr. Gross also dealt with space communications, and stated the responsibilities facing the ITU:

" It is absolutely clear that the ITU has a vitally important role to play in space communications. The United Nations General Assembly, which first



Dr. Federico Nicotera, Chairman of the Assembly

handed this problem over to us in a famous Resolution No. 1721 adopted in December, 1961, passed a further Resolution last month again emphasizing the importance of international co-operation to achieve effective satellite communications on a worldwide basis and urging us to continue with the work on which we have started and to face up to our responsibilities. In the face of this appeal by the most important forum in the world, the ITU must act strongly and quickly or it will not, quite frankly, be justifying its existence."

GIFTS

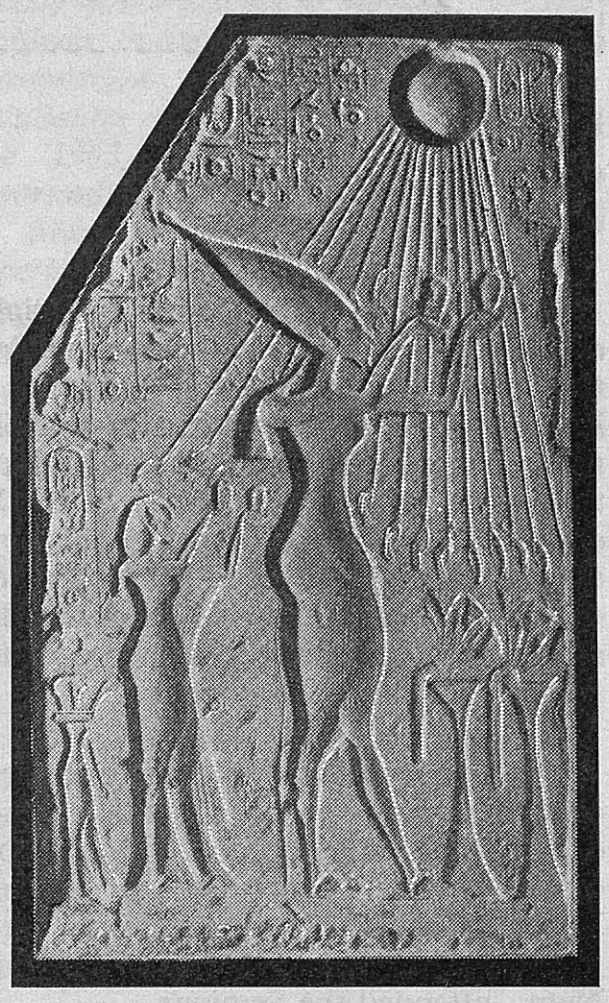
UNITED ARAB REPUBLIC

1 2

1. The goddess Bastet, represented in the form of an Egyptian cat (26th dynasty, 660 B.C). The statue measures 45 cm in height.

2. A very fine head (30 cm) of Queen Nefertiti (18th dynasty, 1350 B.C.)

3. Bas-relief (85 cm × 52 cm) showing the pharaon Akhnaton making offering to the Sun (18th dynasty, 1350 B.C.)



3

4, 6. Two statues (90 cm) of the goddess Isis (4) and the god Osiris (6) (26th dynasty, 660 B.C.)

4

5

5. A reproduction of the statue (natural height, 1.65 m) of the pharaon Khefren, builder of the second Guizeh pyramid (4th dynasty, 2600 B.C.)

6

technical co-operation

Paris Seminar on Telecommunications in tropical countries

A Seminar on " The General principles of organization of national telecommunication networks in tropical countries ", intended primarily for the French-speaking newly independent countries of Africa, was organized in Paris from 3 to 15 December, 1962, by the French Administration, as its contribution to the programme of Technical Assistance in kind of the ITU and part of the Union's activities in the field of Technical Co-operation.

Nineteen participants from seventeen countries—Cameroon, Chad, Congo (Brazzaville), Congo (Léopoldville), Ivory Coast, France, Great Britain, Guinea, Mali, Mauritania, Morocco, Niger, Senegal, Sweden, Togo, Tunisia and Viet-Nam—attended the Seminar.

On behalf of the Minister of PTT and the Director-General, Mr. R. Coste, Engineer-General, opened the Seminar on 3 December. Welcoming the participants, he explained, in general terms, the scope of the studies to be conducted during the ensuing days. Mr. V. R. Sundaram, Chief of the Department of Technical Co-operation of the ITU, then welcomed the participants on behalf of the Secretary-General of the Union. The same evening the Minister of PTT, H. E. Jacques Marette, held a reception in honour of the participants in the Seminar. He expressed the hope that their presence in the detailed technical studies of the type undertaken during the Seminar would greatly help the technicians and engineers assembled in Paris to meet the challenge involved in the development of their respective countries and that, in addition, it would foster international understanding and cordial relations throughout the world.

Lectures and visits

During the Seminar fourteen technical lectures were given by the Engineers of the French PTT. These were supplemented by seven visits to various installations of the French PTT in and around Paris. In addition, Mr. R. Chapuis, Counsellor of the International Telegraph and Telephone Consultative Committee (CCITT) explained the activities of the Consultative Committees of the ITU in connection with the development of national telecommunication networks; and Mr. Sundaram gave a short talk on the different Technical Assistance Programmes in which the ITU participates.

The Seminar was concluded on Saturday, 15 December, with a reception given by Mr. R. Croze, the Director-General of the French PTT. Mr. Coste, speaking on behalf of the Director-General, expressed his satisfaction at the interest shown by the participants in the various technical studies and visits and hoped that these studies would greatly facilitate their future tasks in their respective countries. On behalf of the Secretary-General of the ITU, Mr. Sundaram thanked the French Administration for the great trouble they had taken in

ITU experts — Mr. C. W. C. Richards (above), Mr. H. G. Arthur (left) and Mr. William B. Jago (right)

organizing the Seminar, and the various lecturers, who had contributed so much to its success. He also thanked the participants for their presence in the Seminar and hoped that they would carry back happy memories of their work in Paris and would find the knowledge they had gained useful in its application to their national problems.

Federation of Malaya

Mr. C. W. C. Richards, an ITU technical assistance expert in the Federation of Malaya, visited ITU headquarters in November last for discussions regarding the new Telecommunications Training Centre which is to be established in Kuala Lumpur with the aid of the United Nations Special Fund. The centre will be a residential school providing specialized vocational training for engineering and operational personnel of the Malayan Telecommunications Department. At the outset it will have a maximum capacity of 200 men and 25 women trainees who will attend for varying periods of from one to six months. Trainees will be selected from all parts of the Federation of Malaya and from Singapore, and in special cases from other countries in south-east Asia. Unlike most training establishments it will have no fixed pattern of terms or semesters but will operate continuously with a multiplicity of interleaved training courses.

There will be a regular intake of trainees at adolescent level but the centre will be essentially an adult training centre with a substantial proportion of the trainees already holding positions of some seniority and responsibility in the administration. It will be the aim of the centre to inculcate a high degree of pride in, and loyalty to the Telecommunications Service; a residential centre, with its opportunities for meeting and mingling after school hours, will help foster a spirit of corporate unity within the Service. Training will take the shape of lectures, demonstrations and practical work sessions and will be characterized by a considerable degree of specialization on equipment of some complexity: this complexity is reflected in the facilities which are required in the various sections of the teaching unit. It is hoped that the teaching block building will be completed by the end of 1963.

Mr. Richards is an engineer with the United Kingdom Post Office and has been working in the field of technical assistance since 1951, mainly in Pakistan and Burma. He is a well-known radio amateur and was the first in Asia to use the single-sideband mode of operation. Earlier this year he set up his station at Malaya's first Radio and Television Exposition and, operating with an antenna inside a steel-framed building, maintained daily schedules with the Club station, 4 U1ITU, at ITU headquarters throughout the period of the exposition.

Libya

Mr. H. G. Arthur, of the Engineering Branch of the New Zealand Post Office, has just completed a tour of three months in Libya reviewing progress made in radio frequency usage in the Radio Section of the Directorate General of Telecommunications. Although the population of the country is only 1 300 000, the great distances between towns and villages, and in general the small demand

for channels between groups has, for economic reasons, required the use of HF radio circuits.

In addition, there has been a very rapid build-up of demand by oil prospecting companies for circuits to remote areas where distances of up to 850 kilometres are involved.

To meet the demand for radio circuits, for public, aeronautical, maritime, private, defence and police circuits more than 1100 frequencies have been recorded in the Master International Frequency Register.

Mr. Arthur said: "The checking and control of such a number of assignments places considerable a load and responsibility on those delegated to carry out the task. If the engineer responsible for this work is to operate effectively an adequate staff needs to be established to give assistance, particularly in handling the documentation involved and in the monitoring of transmissions."

Vocational training in the Philippines

Mr. William B. Jago, telecommunication engineer with the United Kingdom General Post Office (GPO) went to the Philippines last January to organize the telecommunication vocational training centre set up by the Special Fund at Manila. Mr. Jago, who has been with the GPO for thirty-five years, is now Assistant Staff Engineer in the Telephone Exchange Department.

international

ECAFE Telecommunication Meeting

The Eleventh Session of the Inland Transport and Communications Committee of the Economic Commission for Asia and the Far East "ECAFE" took place in Bangkok, Thailand, from 3 to 11 December, 1962.

Telecommunications were well represented in the national delegations, there being three representatives of telecommunication interests in the delegations of both Japan and Thailand and one each in the delegations of France, the Republic of Korea and the Philippines. The ITU was represented by Mr. T. R. Clarkson, Senior ITU Telecommunication Expert in the ECAFE Region, and Mr. K. Vasudev Pai, Regional ITU Expert.

The agenda covered a wide range of topics. Of particular interest was item 11 (Progress Report on the implementation of recommendations of the Working Party of Telecommunication Experts), for which Mr. Pai had prepared a note on the development of telecommunications in the ECAFE Region. After pointing out, among other statistics, that there were only 9 million telephones in the Region out of the general world total of 141.7 million (about 6% of the total), Mr. Pai's paper developed the theme of the importance of telecommunications in relation to economic development.

In the course of the discussion on item 11, U Nyun, the Executive Secretary of ECAFE, welcomed the ITU experts to ECAFE headquarters to participate in the ECAFE/ITU joint unit. He expressed the view that the agreement recently signed between ECAFE and the ITU embraced all the points necessary to ensure effective work.

IIIrd International Television Symposium

The IIIrd International Television Symposium, organized once again by the Town of Montreux, will be held from 20 to 24 May, 1963. It will be devoted essentially to technical problems related with television operating technique. It will thus differ from the first two Symposiums which dealt more especially with technical questions in the field of television. Specialists will be discussing various operating problems, in particular the production and transmission of programmes, and the installation and distribution of studios. The 1963 Symposium will offer the opportunity to television specialists from all over the world to compare their experiences and exchange ideas.

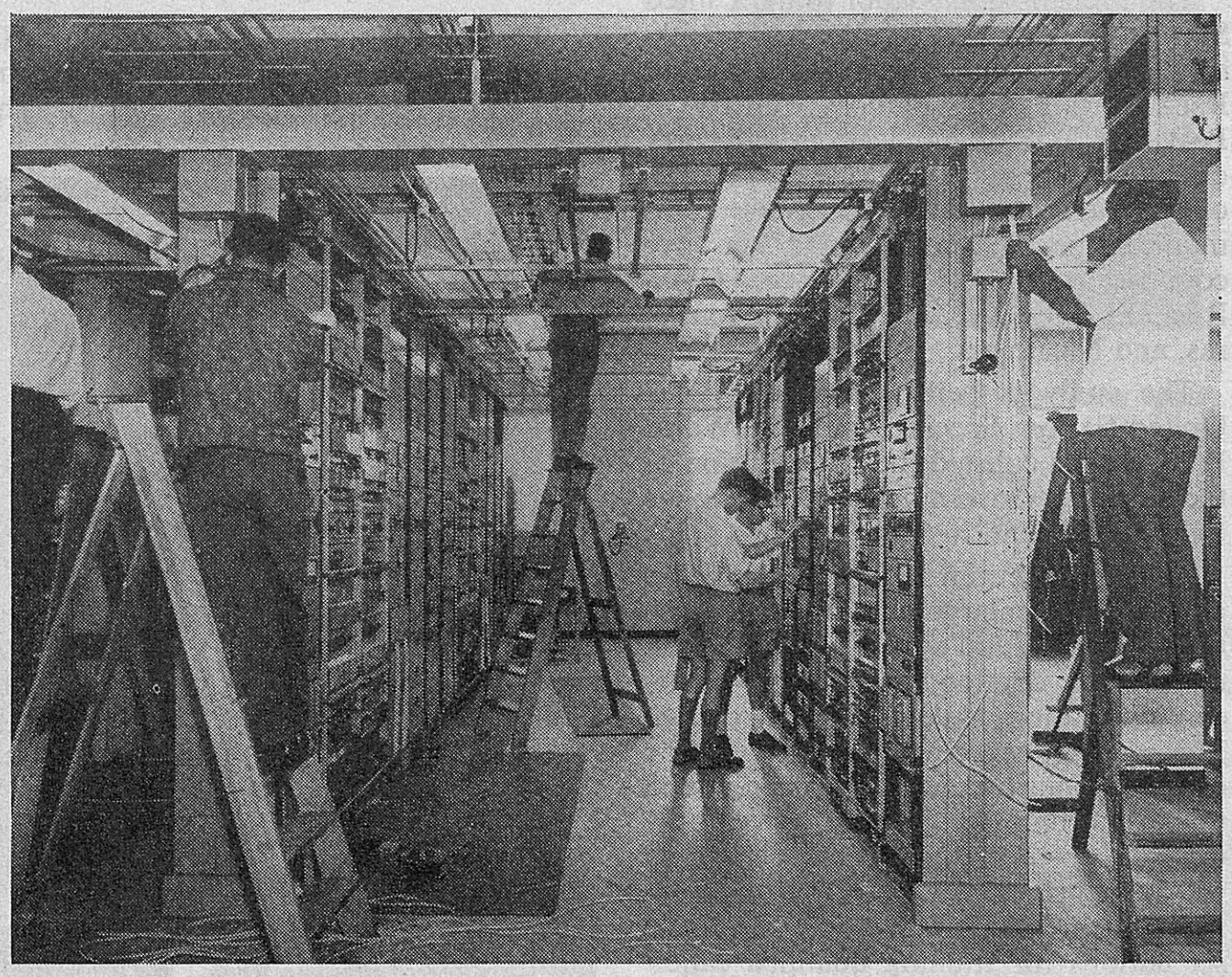
It is planned to provide each participant with illustrated summaries of the lectures given and, as in previous years, honorary diplomas will be granted to some pioneers of television.

New Zealand-Fiji cable

The lightweight deep-sea telephone cable which today links New Zealand and Fiji, a distance of 1150 nautical miles, was made at Southampton by Standard Telephones and Cables Limited (STC).

Bringing "solid" telephone circuits to Fiji for the first time—the radiotelephone has been used until now—the new cable is the second major link in Compac, the trans-Pacific telephone cable. The first section, linking Australia and New Zealand, came into service on 9 July, 1962.

Today's new cable links Auckland with Suva and has the capacity for carrying eighty simultaneous two-way telephone conversations completely free of interference and interruption. This high capacity, and indeed the very existence of a telephone cable of such length, are due entirely to the modern



Installation work in progress on STC shore terminal equipment at Suva, Fiji, for the New Zealand/Fiji telephone cable

(Photo : STC)

submerged repeater which maintains the strength of the high frequency signals along the cable. — *STC*.

Uniform time and constant frequency for the year 1963

Further to the decision of the International Committee of Time of the International Astronomical Union (IAU) at Berkeley in August, 1961, the General Assembly of the International Scientific Radio Union (URSI) in London, in September, 1960, and CCIR's Study Group VII in Geneva, April-May 1962, the International Bureau of Time, after having consulted the observatories which have cesium atomic resonators and after comparing their astronomical observations, has calculated the nominal value of the frequency to transmit during the year 1963.

This is -130×10^{-10} with regard to the scale of time such that the frequency of cesium has the value f (Cs) = 9 192 631 770 c/s. The value indicated will not change during the course of 1963. It is the same as the 1962 value.

The International Committee of Time, URSI and CCIR Study Group VII recommend that the value of the frequency indicated by the International Bureau of Time be utilized by the organizations desiring to transmit uniform time and constant frequency.—*International Bureau of Time*.

Telecommunication expansion in Central America

The French Ambassador to the United States, Mr. Hervé Alphand, recently signed an agreement with the World Bank whereby the French Ministry of Posts and Telecommunications will carry out a study looking toward the expansion of telegraph, telephone and radio communications in Panama and the five countries of Central America: Costa Rica, El Salvador, Guatemala, Honduras, and Nicaragua.

The study is being financed by the United Nations Special Fund. The World Bank, which enlisted the co-operation of the French Government, is acting as Executing Agent.

The ultimate aim of the participating nations is to enlarge and modernise the telecommunication system of each country and to develop an integrated telecommunication system for the region. The regional aspect of the study will be of added value because of the strong trend toward economic integration of the Central American countries. The study will be supplemented with the establishment of three fellowships in each of the six nations for training qualified candidates in the management and operation of telecommunication services.—*World Bank*.

New Chairman of the Commonwealth Telecommunications Board

Mr. Dawson Donaldson, B. Sc., M.I.E.E., formerly Director General of the New Zealand Post Office, took up his new post as Chairman of the Commonwealth Telecommunications Board, on 1 December, 1962.

The retiring Chairman, Sir Ben Barnett, K.B.E., C.B., M.C., has served in this capacity for over six years, having previously been Deputy Director General of the United Kingdom Post Office.

The Commonwealth Telecommunications Board was set up in 1949, as a result of the Commonwealth Telegraphs Agreement, 1948, " for the purpose of promoting the efficiency and development of the external telecommunications of the British Commonwealth and Empire." The Board is composed of representatives of the Partner Governments with an independent Chairman. Its present members represent Britain, Canada, Australia, New Zealand, India, Ceylon, the Federation of Malaya and Rhodesia and Nyasaland; there is also a member for Commonwealth territories not otherwise represented, and new members are due to be appointed by Cyprus, Nigeria, and Ghana. Other independent Commonwealth territories have been invited to join the partnership and appoint members.—*United Kingdom General Post Office*.

Asian training course in educational television

The Japanese National Commission for UNESCO together with the Japanese Broadcasting Corporation *Nihon Hoso Kyokai (NHK)*, has just held, with the support of UNESCO, a regional training course in educational television for producers and educators from ten Asian countries and territories: China (Taiwan), Hongkong, India, Iran, Korea, Malaya, Pakistan, Philippines, Singapore and Thailand. Participants spent four weeks at the NHK Training Institute in Tokyo, listening to lectures, screening some forty

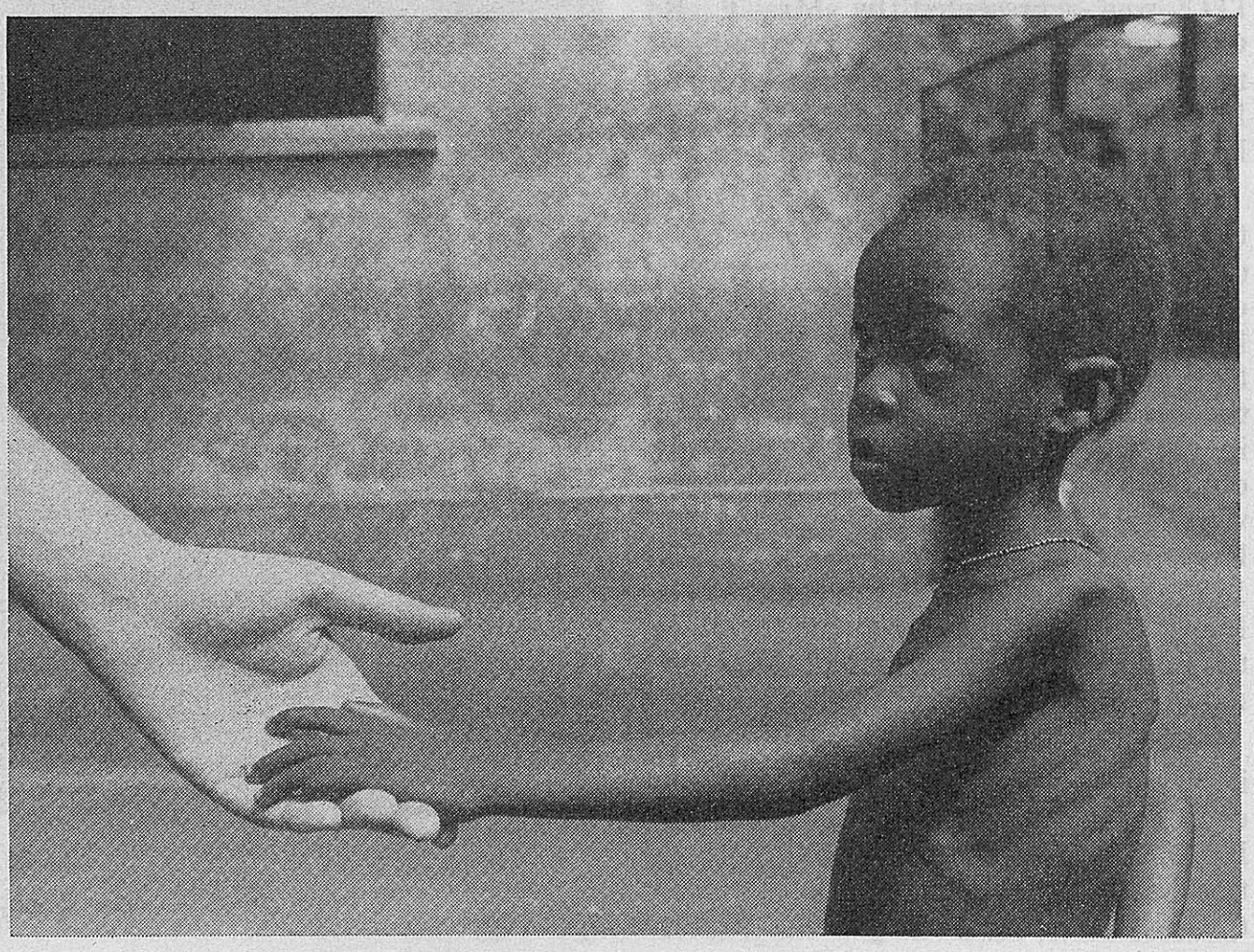
Freedom from Hunger Campaign –

In the spring of 1963, the Freedom from Hunger Campaign launched by the United Nations Food and Agriculture Organization (FAO) will be marked by two important events: the International Week of the Freedom from Hunger Campaign which will begin on 21 March, and the International Food Congress which will be held from 4 to 18 June.

International manifestations of solidarity will take place on this occasion in support of the Campaign, which was originated in 1959 by the FAO General Conference.

Aims of the Campaign

The main aim of the Freedom from Hunger Campaign is to help bring to citizens everywhere a living awareness of the problems raised by malnutrition among more than half the population of the world. These problems, apart from the suffering and



(Photo: FAO)

programmes from many parts of the world, visiting Japanese production centres, schools and teleclubs, and receiving practical instruction which culminated in the production of two sample programmes.

Participants came away from the course with two dominant impressions: television offers far greater educational opportunities than they had assumed, and the production of educational television programmes is a more complicated and exacting task, not only than the production of corresponding radio broadcasts, but frequently also than the production of entertainment programmes. — *UNESCO Features.*

The Belgium-United Kingdom submarine cable

The submarine cable which has connected Belgium and the United Kingdom since 1948 will be equipped with transistorized repeaters in the course of 1964. This will enable the number of telephone channels to be increased from 216 to 420.—*Radio-Revue.*

administrations and operating companies

Electronic telephone exchanges in the United Kingdom

The first electronic telephone exchange to go into public service in Europe, was opened by the Postmaster General of the United Kingdom, the Rt. Hon. Reginald Bevins, M.P., on 12 December, 1962.

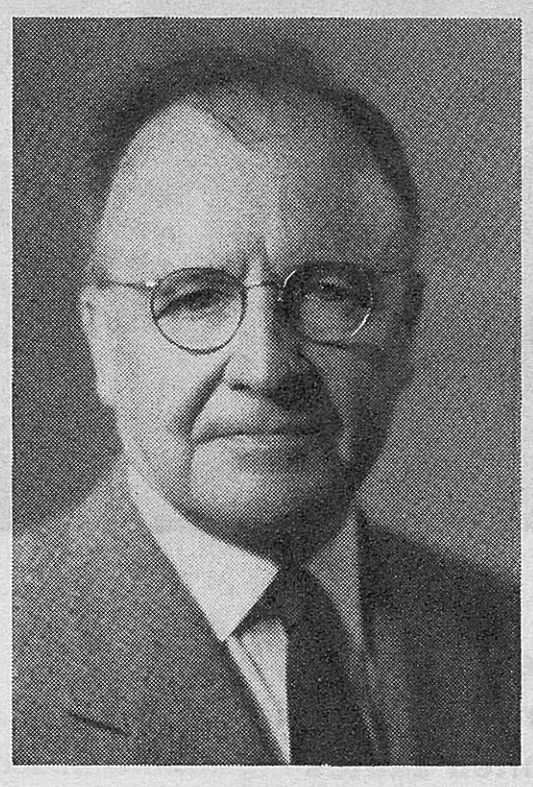
The exchange, Highgate Wood, London, of 800 lines, operates on the principle of time division multiplex using pulse amplitude modulation which enables 100 speech channels to be carried simultaneously on a single highway. Setting-up and register functions are also time-shared. This is believed to be the first exchange employing this combination of multi-plexing and modulation techniques to be used for public traffic anywhere in the world.

Highgate Wood is in the nature of an advanced field experiment, following the success of a smaller exploratory installation at the United Kingdom Post Office Research Department at Dollis Hill, London, in 1959. Three further electronic exchanges of more sophisticated type are now being built. Two of these, Pembury and Goring-on-Thames, will replace manual exchanges and the third, at Leighton Buzzard, will replace an early type of automatic exchange.

Two of these exchanges are based on slightly different applications of the time division pulse amplitude modulation principle. The third, that at Leighton Buzzard, is based on space division switching.—*United Kingdom General Post Office.*

Dr. J. Howard Dellinger

It is with deep regret that we have to announce that the great radio scientist, Dr. J. Howard Dellinger, died on 28 December, 1962.



An account of his long and distinguished career can be found in the Telecommunication Journal of August 1961, when he was the «Telepersonality» of the month.

role of world telecommunications

the human degradation that they cause, are a serious threat to peace and the evolution of mankind. The next aim of the Campaign is to inform the public of these facts and to create a state of mind throughout the world that will foster efforts to find solutions for these vital problems.

For this purpose, the Campaign attempts to attack the problem of hunger on a broad front and at all levels, using every social and economic resource to do so. It defines three sectors of operation: *a)* information and education, *b)* research, and *c)* action.

Necessity of the Campaign

The need to increase food resources throughout the world is more urgent than ever since the rate of population increase is steadily rising. A few figures will give an idea of the seriousness of the problem: in 1960, the population of the world was 2920 million, in 1970 it will be 3500 million, and 6280 million in 2000. The problem is complicated and made more serious by the fact that, in all likelihood, this increase will be greatest in the underdeveloped regions of Asia, Africa and Latin America, where a large proportion of the population is often even now under-nourished and the birthrates are the highest that have ever been recorded in the history of mankind.

ITU co-operation

The Economic and Social Council of the United Nations has recently stressed the importance of such a campaign within the framework of the United Nations Development Decade by asking all countries Members of the United Nations to support it.

All governmental or non-governmental international organizations have been called upon to subscribe to the FAO effort in their own specialized spheres and within their resources.

At its 1960 Session, the ITU Administrative Council, on a proposal by the Secretary-General of the Union, Mr. Gerald C. Gross, studied the matter and adopted a resolution stressing the importance of this Freedom from Hunger Campaign and the vital part that telecommunications can play in the production and distribution of food products. This resolution also recommends the Members and Associate Members of the Union to see that telecommunication services shall do their utmost to help toward the success of the Campaign.

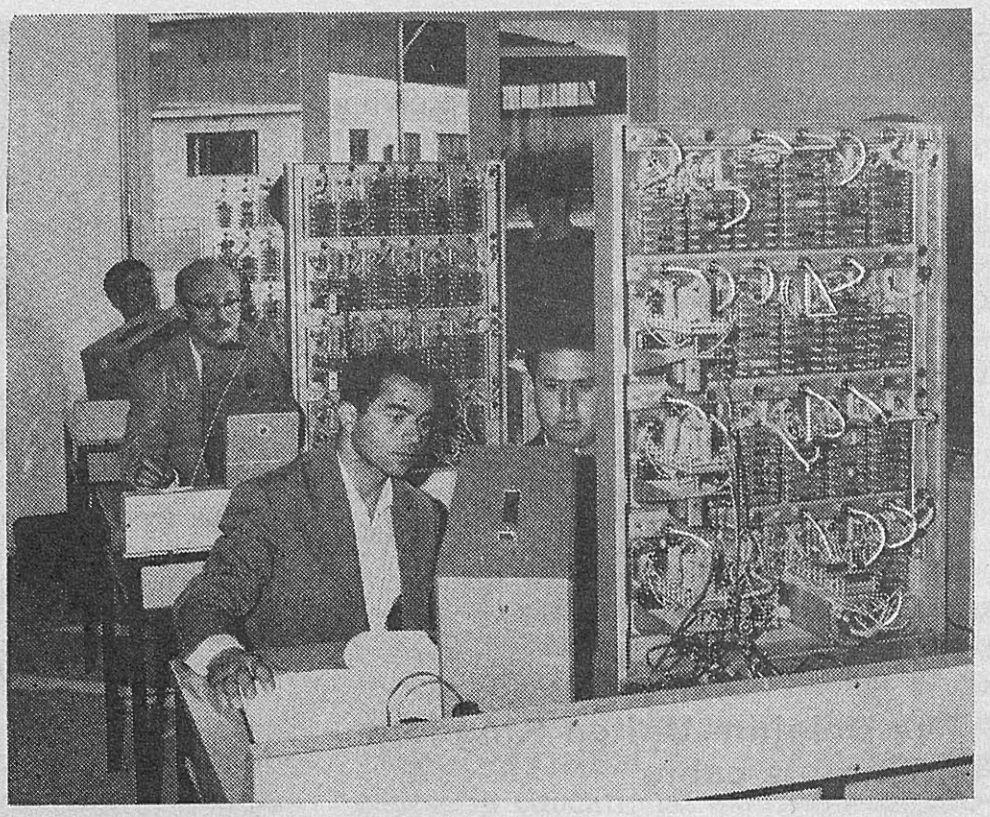
In the circumstances, there can be no doubt that the telecommunication services will give every assistance in their power to the Freedom from Hunger Campaign, more especially during the International Week beginning on 21 March and the International Food Congress which will be held from 4 to 18 June 1963.

Development of civil aviation services in Morocco

With the growing demand for highly specialized technicians in aviation, due to the advent of the jet propulsion age, United Nations experts now plan for the creation of a Civil Aviation School in Morocco. The training of maintenance workers, meteorologists, radio and aircraft mechanics will be combined under one government body with the help of $1.7 million from the UN Special Fund. In an effort to make these services available to more than one country, they will complement those activities of Tunisia, whose programme now embraces the training of operational personnel.

At the Centre for Training of Telecommunication technicians, students are seen:

(1) at radio junction boards,
(2) in an advanced class of electronics,
(3) splicing and soldering wires.—*United Nations.*



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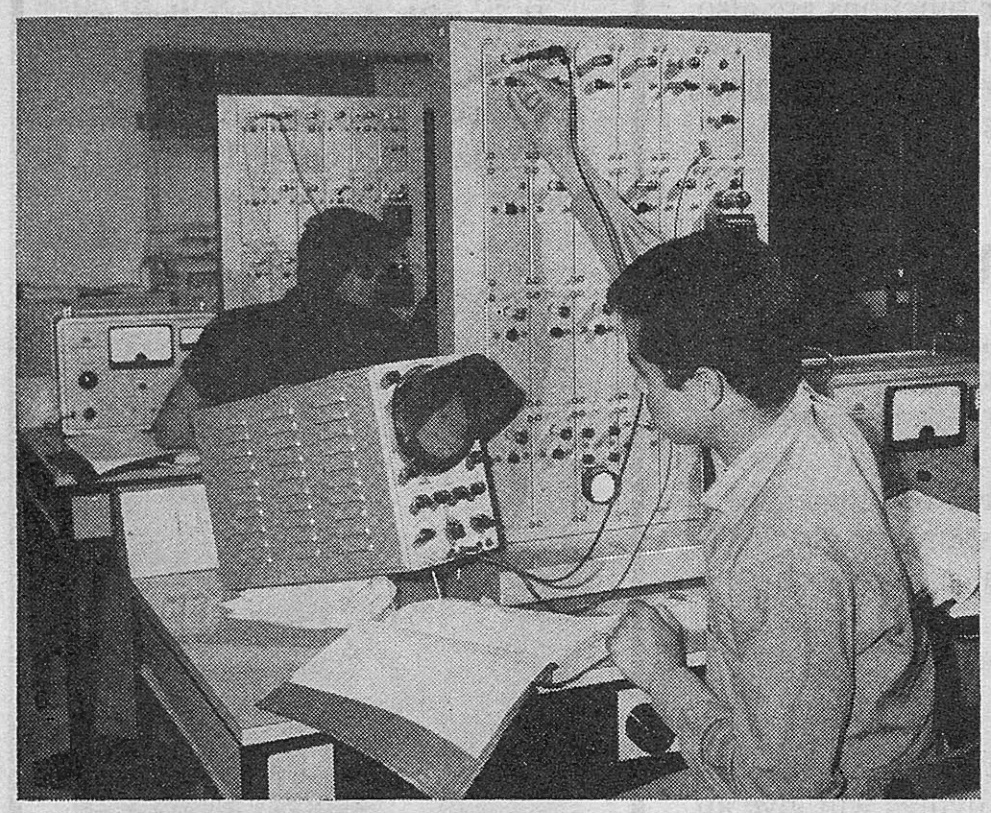

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(Photos: UNO)

Frequency and time transmission in the United States

The National Bureau of Standards (NBS) of the United States Department of Commerce is in the process of raising 120-metre antennas and building 50-kW transmitters to substantially increase the coverage of the standard frequency and time transmissions of NBS stations WWVB (60 kc/s) and WWVL (20 kc/s). The new facilities will be located at a carefully-chosen site near Fort Collins, Colorado.

The wide-scale distribution of the United States frequency standard and of time signals is needed to co-ordinate the operations of the global network of missile and satellite stations, to improve the uniformity of frequency measurement on a national and international basis, and to provide a more accurate " yardstick " of frequency-easily available to many users—for electronic research and development.

The importance of higher accuracy and wider distribution in the transmission of the United States standard of frequency is indicated by the strong support which this programme has received from the National Aeronautics and Space Administration (NASA). This agency provided financial assistance for construction of both the initial 20-kc/s station (WWVL) and the transmitters and large antenna for the new 20-kc/s station.

Both WWVB and WWVL have been transmitting for several years from sites near the Boulder (Colorado) Laboratories of the Bureau. The existing stations are quite small and electrically inefficient but they have served to substantiate the basic concepts of using the lower frequencies to obtain more stable signals and wider coverage for standard frequency and time-signal broadcasts. Although WWVL, located in the mountains near Boulder, radiates less power than a fifteen-watt light bulb, its signal has been received in New Zealand. Even under present conditions the reliability and accuracy of signals from the two stations has enabled some organizations to cancel plans for installing expensive atomic frequency standards within their own laboratories.

With the new antennas and transmitters the radiated power of WWVL will be increased to 1 kilowatt; for WWVB the radiated power will be increased from 2 watts to 7 kilowatts. Signals from both stations will be compared continuously with the United States frequency standard, which is provided by two cesium beam atomic clocks maintained by the NBS Radio Standards Laboratory.

The 60-kc/s transmission of WWVB is particularly designed to serve users in the continental United States, since signals

at this frequency propagate with more stability than those at 20 kc/s for distances up to about 3200 kilometres. Time signals (to be given for the first time at 60 kc/s) will offer a precision ranging from a hundred-thousandth to a millionth of a second, depending upon the distance from the transmitter. This is hundred to thousand times more stable than the short-wave signals from NBS station WWV, Beltsville, Maryland. The WWVB time signal will be emitted once per second and will consist of modulation by five cycles of a 1000-c/s sine wave.

The WWVL 20-kc/s transmission is designed to extend the experimental studies required to provide accurate time signals, clock synchronization, and frequency transmission over most of the world with very narrow band signals.—*United States National Bureau of Standards.*

Japanese ground station for communication satellite tests

The Japanese government will install ground station facilities for use in the testing of communication satellites. The United States and Japan have exchanged notes confirming a memorandum of understanding between the National Aeronautics and Space Administration (NASA) and the Japanese Ministry of Posts and Telecommunication providing for such co-operation.

The agreement provides that the Japanese Ministry will make available a ground station capable of communication by satellite, while NASA will arrange, to the extent technically feasible, for use of experimental communication satellites locally by Japan as well as on a joint basis.

The agreement provides that "Transmissions over the satellite links in the co-operative programme are to be used for test purposes only and are not for commercial exploitation. The two co-operative agencies, however, will use their best efforts to arrange for demonstrations of telephone, radio, television and wire-photo through domestic telecommunication networks."

NASA and the Japanese Ministry will exchange scientific information and will designate a central point for technical liaison. Each agency will defray its own costs, and there will be no exchange of funds. Japan will also have a representative on NASA's international ground station committee, which advises in the co-ordination of schedules, technical requirements, and related arrangements for such testing.—*Telecommunications Reports.*

United States satellites — present and future

According to information made available by the National Aeronautics and Space Administration (NASA) transmitters on the following fourteen satellites were still in operation during early December, 1962.

Satellite name	Date launched	Inclination to equator in degrees	Time between successive passes, minutes	Frequency Mc/s
1. Vanguard I	17 March, 1958	34	134	108.024
2. Transit IV-A	29 June, 1961	67	104	54, 150, 324 and 400
3. Injun-SR-III	29 June, 1961	67	104	136.5
4. Tiros IV	8 February, 1962	48	100	136.23 and 136.92
5. Oso I	7 March, 1962	33	96	136.744
6. Ariel I	26 April, 1962	54	101	136.408
7. Tiros V	19 June, 1962	58	101	136.235 and 136.992
8. Telstar I	10 July, 1962	45	158	136.05
9. No name	17 September, 1962	82	90	108.09
10. Tiros VI	18 September, 1962	58	99	136.235 and 136.922
11. Alouette	29 September, 1962	80.5	106	136.979
12. Explorer XIV	2 October, 1962	33	2185	136.44
13. Explorer XV	27 October, 1962	18	315	136.101
14. Anna IB	31 October, 1962	50	108	136.815

To hasten the development of an optimum *commercial* operational satellite communication system, the United States plans a variety of additional experiments during 1963. As many as four low-or-intermediate satellites of the Telstar and Relay active repeater types are expected to be placed in orbit during the year. It would require approximately forty of these satellites, orbiting between 100 and 15 000 km, to provide continuous communication on a world-wide basis. At least two high-altitude, synchronous, active repeater satellites are also expected to be placed in orbit during 1963. Called Syncom, these satellites would orbit at 36 000 km, from where a fixed relationship would be maintained continuously with any point within a visible area equal to one-third of the Earth's surface. Three such satellites would provide communications to almost every point on earth.

The United States plans to launch its second Echo passive communication satellite early during the year. Echo II, a rigidized 41 metres diameter balloon, will act as a giant man-made reflector of radio signals in the UHF and microwave regions. This will be followed later in the year with a Rebound launching. Rebound consists of several Echo-type passive communication satellites which will be launched from a single rocket booster. It is planned to eventually design an optimum operational system from the detailed technical data obtained from the active and passive communication satellite experiments planned for 1963.

On the radio amateur side, steady progress continues on the development of Oscar III. The third in the series of radio amateur satellites will be an active repeater, capable of relaying 2 metre signals across the country, and perhaps across oceans and continents.

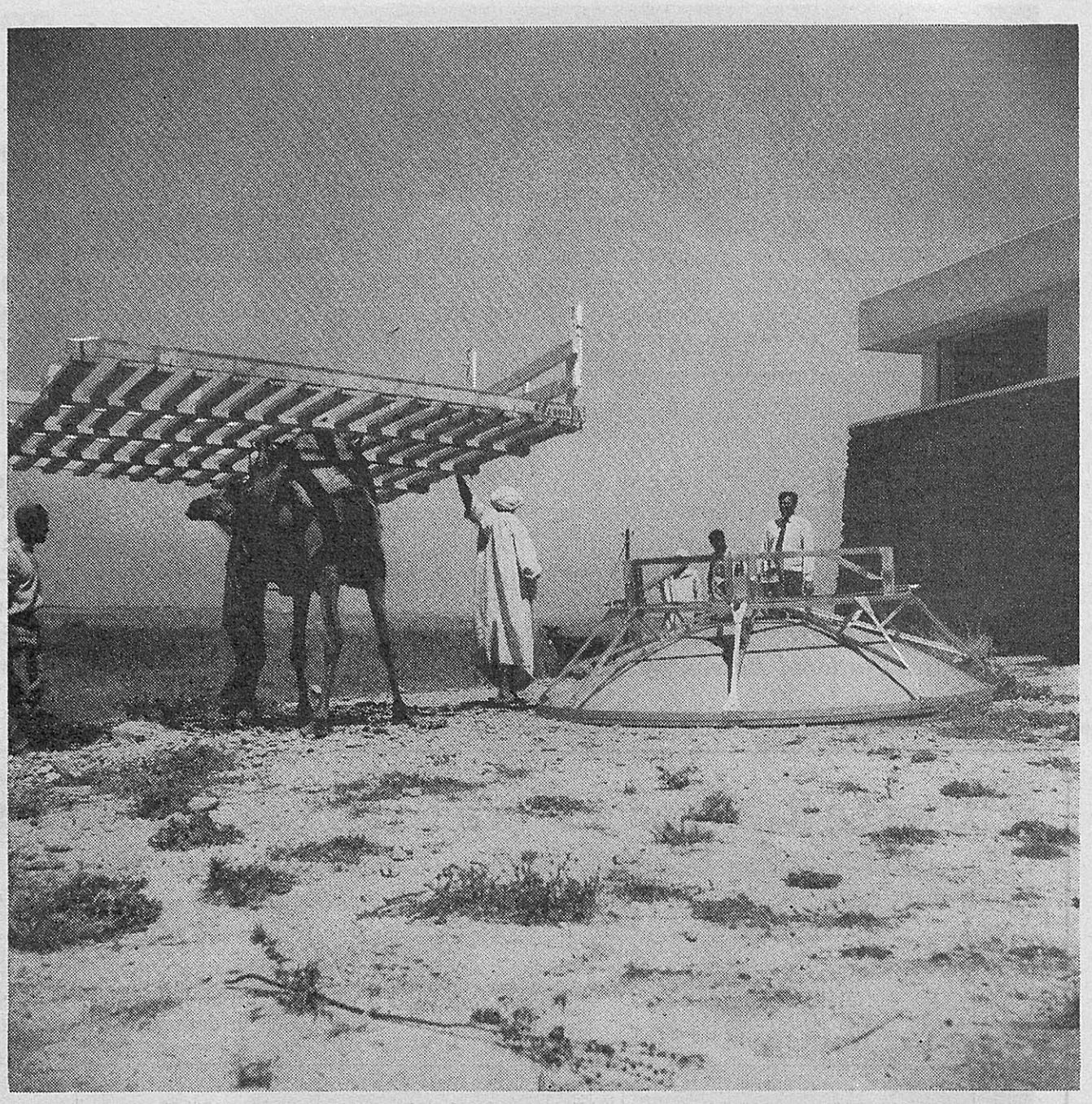
The electronic circuitry for Oscar III has been successfully developed. The repeater section is operating on the ground, relaying 2 metre signals in the San Francisco area. A solar cell power supply, and the package configuration is now under intense development. At last reports, it seems almost certain that Oscar III will be ready for launch before the middle of 1963. A successful launching for Oscar III will make space communications for amateur radio a reality during 1963.—*CQ*.

Television in Morocco

Marelli Lenkurt of Sesto San Giovanni (Milan), Italy, (an associate of General Telephone and Electronics International Inc.) have recently completed the temporary installation of a television radio channel from Casablanca to Marrakech, Morocco, within about five weeks from receipt of the order.

The radio channel, which was ordered by *Radiodiffusion et Télévision marocaine*, provides television service between these two important Moroccan cities. The circuit, which is 247 km long, consists of four hops with repeaters located at Settat, Skhour-des Rehamna and Sidi Bou Otmane. The equipment operates in the 4000 Mc/s television band and provides one-way transmission of signals from Casablanca to Marrakech, with standby equipment being provided.

The permanent installation will be completed in the near future. In the meantime the contract has been extended to include a two-way television radio channel without standby equipment between Casablanca and Rabat. This circuit will also be in the 4000 Mc/s band and will consist of two hops. The total distance is about 92 km.—*General Telephone and Electronics Corporation.*



Increasing automation of international telephone and telex traffic in the Federal Republic of Germany

Telephone traffic

According to an official survey conducted in May, 1962, 25.1 per cent of a total of 1304 million outgoing telephone calls to foreign countries were handled in the manually operated service, 46.9 per cent in the semi-automatic and 28.0 per cent in the automatic traffic. According to these figures as much as three quarters (74.9 per cent) of all outgoing international calls are handled under the semi-automatic and fully automatic working procedures and of the total of all outgoing international calls again far more than one third (37.4 per cent) are made in the automatic service. For the time being the traffic relations existing in the automatic service are only those with European countries, however.

The following table shows the structure of the telephone traffic from the Federal Republic of Germany to countries with which traffic relations in the automatic service exist:

	Of every 100 calls the following proportion was handled in the			Proportion of the automatic traffic in relation to the total automatic traffic going to foreign countries
	manually operated service	semi-automatic service	automatic service	
	%	%	%	%
Austria	17.0	59.7	23.3	8.7
Belgium	5.9	53.0	41.1	12.7
Denmark	21.2	54.3	24.5	3.2
France	52.0	37.3	10.7	6.0
Luxembourg	5.5	6.7	87.8	11.4
Netherlands	8.5	47.5	44.0	36.5
Switzerland	22.6	49.3	28.1	21.5
	—	—	—	100

Telex traffic

During the month of August, 1962, 1795 million, i.e. more than four fifths, of a total of 2110 million minutes in the telex service with foreign countries were handled under the automatic working method and the remaining one fifth under the manual or semi-automatic working procedure. According to an official survey on the structure of the manually operated and the semi-automatic telex traffic to foreign countries 44.7 per cent of 100 booked telex calls could be established immediately in the no-delay service. Additional 19 booked calls which also fall under the no-delay service could not be made immediately due to the fact that the wanted subscriber's station was engaged, so that according to these figures the proportion of the total no-delay service amounts to nearly two thirds (63.6 per cent), taking the number of calls as a basis. Of the remaining 36 booked calls 34 were handled under the storage system and 2 booked calls were cancelled.

In the telex traffic with foreign countries the subscriber's trunk dialling is available at present in the relations with Austria, Belgium, Denmark, France, Great Britain, Ireland, Luxembourg, the Netherlands, Norway, Sweden, and Switzerland. The inland traffic is handled without exception under the subscriber's trunk dialling system.—*Federal German Administration.*

New links in Burundi and Rwanda

A protected radiotelegraph connection was opened between Kigali (capital of Rwanda) and Usumbura (capital of Burundi) on 19 November, 1962.

In addition, telex and telephone services have been opened between Kigali (Rwanda) and Belgium, via Usumbura.

In this way, the capital of Rwanda can correspond with all international telex and telephone networks. — *Agence des télécommunications du Burundi et du Rwanda.*

Panama communications system

The second phase of an about 565 kilometres dial telephone system being manufactured and installed for the Republic of Panama by a team of General Telephone and Electronics Corporation subsidiaries has now been completed. The completion of this part of a three-phase programme brought single-party service to more than 2000 additional subscribers in six of the ten provinces of Panama. Twelve cities in the system have direct distance dialling.

The network is privately owned by *Comunicaciones SA*, formed for the purpose of providing modern telephone service. The first phase of the programme established a nine-hop microwave link between the cities of Panama and David, with connections to six intermediate cities.—*Telecommunications Reports.*

Radio equipment for Burmese Fokker Friendship

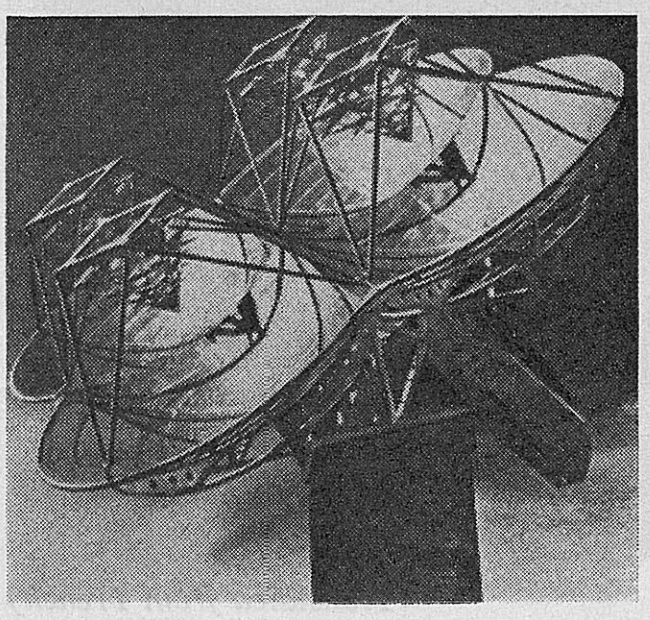
An order has been placed with Marconi's for dual installations of the AD160 VHF communication system and AD722 subminiature automatic direction finding system for the three Fokker Friendship aircraft ordered by the Union of Burma Airways.

Full provision is being made for a single AD260 VOR/ILS system, the main units of which will be installed at a date coinciding with the introduction of the appropriate ground facilities in the operator's territory.—*Marconi News.*

technical

New Telscom system handles telemetry, surveillance and communication functions

A multi-purpose, phase monopulse antenna system with a bandwidth of 200 to 2300 Mc/s has been developed by Radiation Incorporated. Named *Telscom* by its inventor-developer La Vergne Williams, principal engineer at Radiation Inc., the medium-gain antenna system consists of closely spaced reflectors combined with individual log-periodic feeds which are interconnected to produce signal information for tracking purposes.



The aluminium reflector, resembling a clover-leaf, is about 6 metres in diameter, but Telscom's base and pedestal are designed to support much larger dishes.

Telscom can be used in shipboard operations or on large motor vehicles. Its lightweight and rigid construction makes Telscom the fast-moving system required for tracking missile launches or low-flying, high-speed aircraft. The antenna can reach a 15° per second azimuth velocity and 15° per second squared acceleration.

Telscom's wide megacycle range enables it to do the job of several antennas at one installation. Other operational advantages include elimination of down time for changing frequencies, reduction of fundamental bandwidth limitations, and less power needed to drive the antenna because of its lightweight and compact reflector design. Basic feed and reflector assembly provides continuous frequency coverage in excess of a decade bandwidth and no moving or rotating parts are required to develop error signal information.

The receiving system is designed for over-all or spot frequency range, and the antenna's servo circuitry is completely transistorized. Also, the antenna tracking performance is relatively insensitive to mechanical deflections.—*Wire and Radio Communications.*

Radio telescope finds magnetic fields

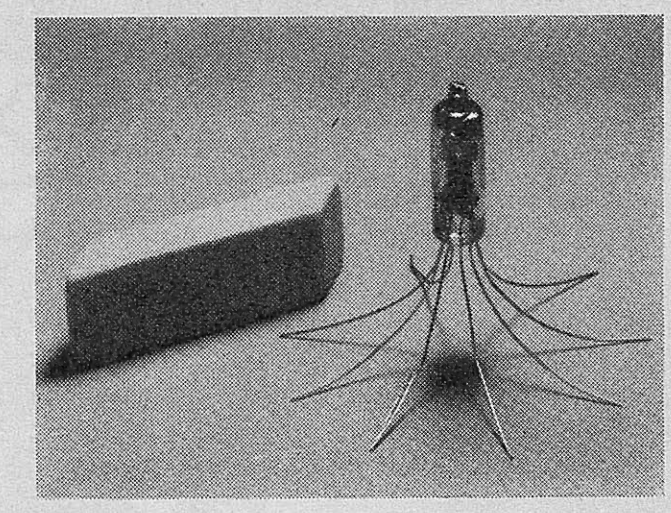
Existence of magnetic fields in space has been proven by scientists of the Commonwealth Scientific and Industrial Research Organization using 5.30 m steerable radio telescope at Sydney, Australia. They discovered linearly polarized radiation from the source centaurus A at frequencies of 3 Gc/s and 1.41 Gc/s. Frequency variation caused Faraday rotation.

The observed Faraday rotation was nearly two orders of magnitude greater than could be ascribed to ionospheric effects and did not vary with diurnal rhythm. There is evidence that the magnetic field is largely uniform in the outer part of the Galaxy (about twenty million light years from the earth) for about five hundred light years.

The discovery reinforces the steady state theory of the universe, because only if matter were created in the universe and then agglomerated to form stars would large magnetic fields be found. —*Electronics.*

New subminiature heater-cathode triode

A "quiet" subminiature, heater-cathode triode designed to operate under extreme environmental conditions has been developed by Raytheon Company.



(Photo: Raytheon Company)

The new, high mu CK8096 is about 20 db lower than conventional triodes in microphonic noise output due to reductions of structural resonances within the audio frequency range. Quiescent noise referred to the grid at 10 c/s is —130 dbV per cycle and at 1000 c/s is —153 dbV per cycle.

Built to withstand impact shock of 450 Gs, acceleration of 1000 Gs, and vibration of 10 Gs over extended periods, the tube has been tested to operate at altitudes of 18 300 metres.—*Raytheon Company.*

telepersonality

26 — JOHANNES D. H. van der TOORN

When the Second world war came to an end in 1945, the Government of the Netherlands, whose first aim it was to rebuild the country that had been devastated by the war, called back all its outstanding men to entrust them with this difficult task. As far as telecommunications are concerned, Mr. Johannes D. H. van der Toorn, by virtue of his technical knowledge, experience and talents as an administrator, was appointed Director of Telecommunications in the Netherlands PTT Administration and took part in this capacity in the reconstruction of the telephone, telegraph and radio services of the Netherlands.

Mr. van der Toorn was born on 8 April 1894 at Scheveningen, near The Hague, and carried out his first studies in the capital. He was attracted by electronics which was then in a phase of full development, and pursued his higher studies at the Technical University of Delft, where he obtained his Diploma of Electrical Engineer.

In 1919, he joined the PTT Administration, which he left three years later for the Bell Telephone Manufacturing Company. From 1931 to 1940 he occupied an important post with the International Standard Electric Company, and during the war he became Director at the Netherlands Standard Electric Company.

After the war, he was appointed by his Government to the post of Director of Telecommunications, as mentioned above. He was to remain with the PTT Administration up to the time of his retirement, after having occupied the post of Director of Radio and General Affairs, from 1950 to 1954, and then the post of Director-General of the Administration up to 1959.

Even after his retirement, he has pursued his activities in the telecommunication world. At present, he is a counsellor with the International Committee for Frequency Allocations which is attached to the International Council of Scientific Unions (ICSU).

From 1947 to 1959, he was a member of *Nozema (Nederlandse Omroep Zender Maatschappij)*, a semi-official organization in the Netherlands which governs all sound and television transmitting stations. A member of the Television Committee from 1948 to 1951, and then of the Television Council, he helped to launch television in the Netherlands.

The high position of Mr. van der Toorn in the Netherlands PTT Administration brought him in contact with the ITU, in whose work he participated in an efficient and regular manner. Already in 1947, at Atlantic City, he played an important role as Chairman of Committee VI of the Radio Conference, this Committee being responsible for preparing the Provisional Frequency Board (PFB). Later he was Head of the Netherlands delegation to the Plenipotentiary Conference of Buenos Aires in 1952 and of Geneva in 1959, which marked a decisive stage in the development of the ITU. His colleagues at this latter conference, aware of his exceptional qualities and of the skill and moderation displayed by him in conducting debates, chose him as chairman. He possesses a gift for harmonizing different points of view without detriment to the clarity and wisdom of the decisions thereby arrived at, and to this gift the success of the conference was in large measure due.

He also took part in the work of the CCIs, participating in all the Plenary Assemblies of the CCIF and the CCIT and acting as Chairman of the Assembly which was responsible for the amalgamation of these two bodies into the CCITT.

His international activities did not end there, for he was Head of the Netherlands delegation to the European Broadcasting Conferences at Copenhagen in 1948 and at Stockholm in 1952.

As Director-General of PTT, he took part in the conferences of the Universal Postal Union (UPU), including the Ottawa Conference in 1958 which emphasized the importance of science and technique for the postal services by creating the Consultative Committee for Postal Studies (CCPS).

This calm and collected, almost laconic man, whose words are worth their weight in gold, and who spends his spare time reading books about art, philosophy and history, has played the role of a subtle diplomat and outstanding technician in the world of telecommunications.—*F.S.*

(Translated from French)

The first flight toward Mars

The following pages give a summary of a recent Tass report. It has been prepared by A. KACHEL of the CCIR.

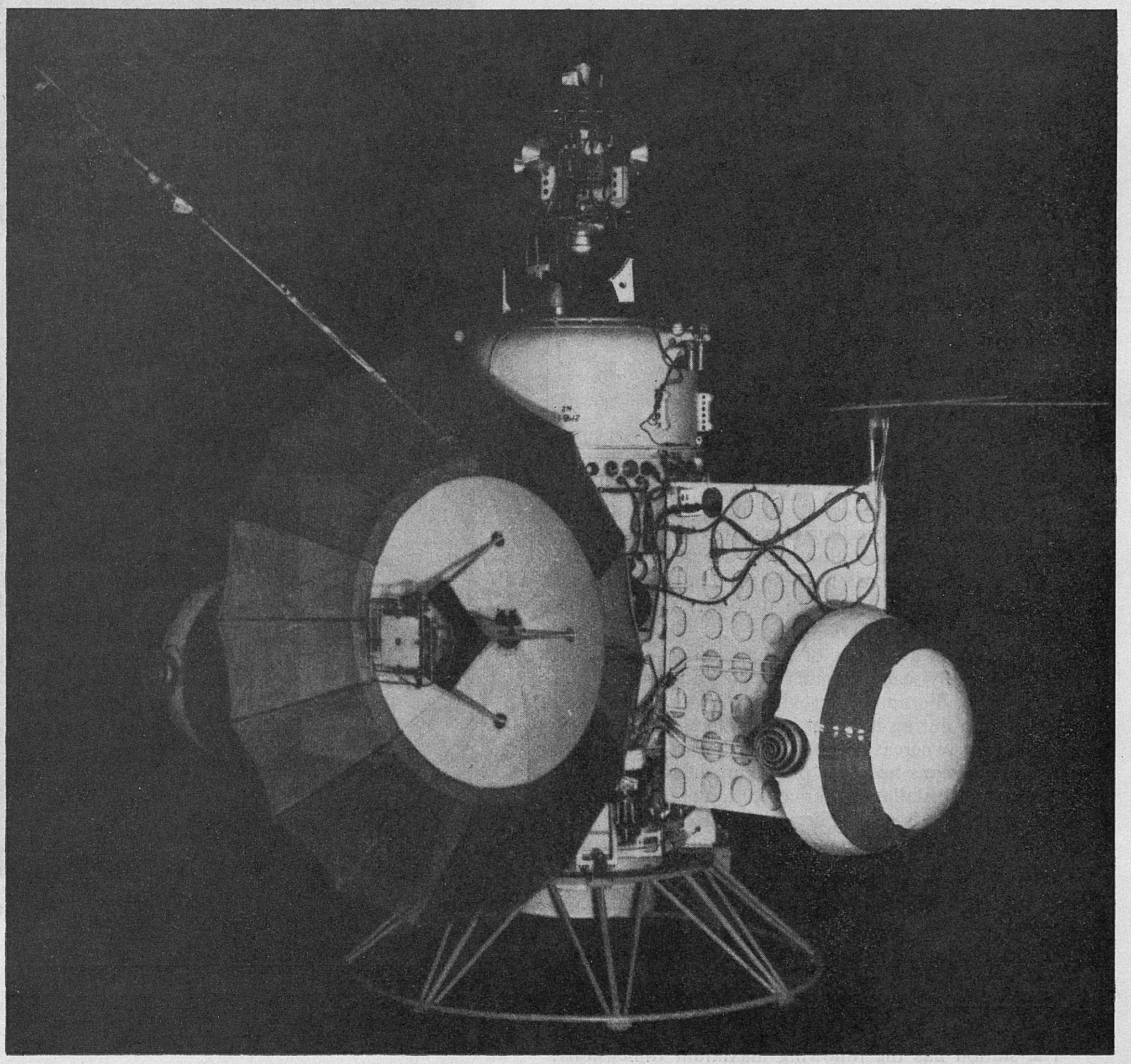


Figure 1. The Mars-1 station *(Photo: Fotokhronika Tass)*

AS PART OF THE RESEARCH PROGRAMME for space and for the planets of the solar system, a space rocket was launched toward Mars in the territory of the Soviet Union, on 1 November, 1962. This is the first such launching in the history of space research.

This rocket was launched from a heavy satellite which had been put into the intermediate orbit around the Earth by an improved booster. Despite considerable technical difficulty, such a system gives a significant power gain for launching heavy interplanetary spacecraft.

Aboard the space rocket was an automatic interplanetary station known as *Mars-1*. It is envisaged that the flight of this automatic station to Mars will take more than seven months.

The main tasks of *Mars-1* are:

— long-term space exploration during the flight toward the planet;

— establishment of interplanetary space radiocommunications;

— taking pictures of Mars and relaying photographs of its surface to the earth by radio.

Details of the station and early results

One and a half month after launching, the Soviet press agency Tass published some details of the automatic station and results of its flight.

When it passes in the vicinity of Mars, the station will be at a distance of 247 million kilometres from the Earth. The calculation of the station flight, according to tracking data, shows that it will pass the planet at a distance of 193 000 kilometres. The station trajectory must be corrected to shorten the distance.

Figure 3 gives a schema of the station. It consists of two hermetically-sealed compartments: one orbital and one planetary. Equipment providing for the functioning of the station during its flight is contained in the orbital compartment, whereas scientific instruments intended to make observations near the planet are in the planetary compartment. Installations for correction of the trajectory solar battery panels, hemispherical radiators for the heat-regulation system and antennae are also installed around the orbital compartment.

Dimensions and exploration instruments

The station has the following maximum dimensions: 3.3 metres in length; the diameter of the orbital compart-

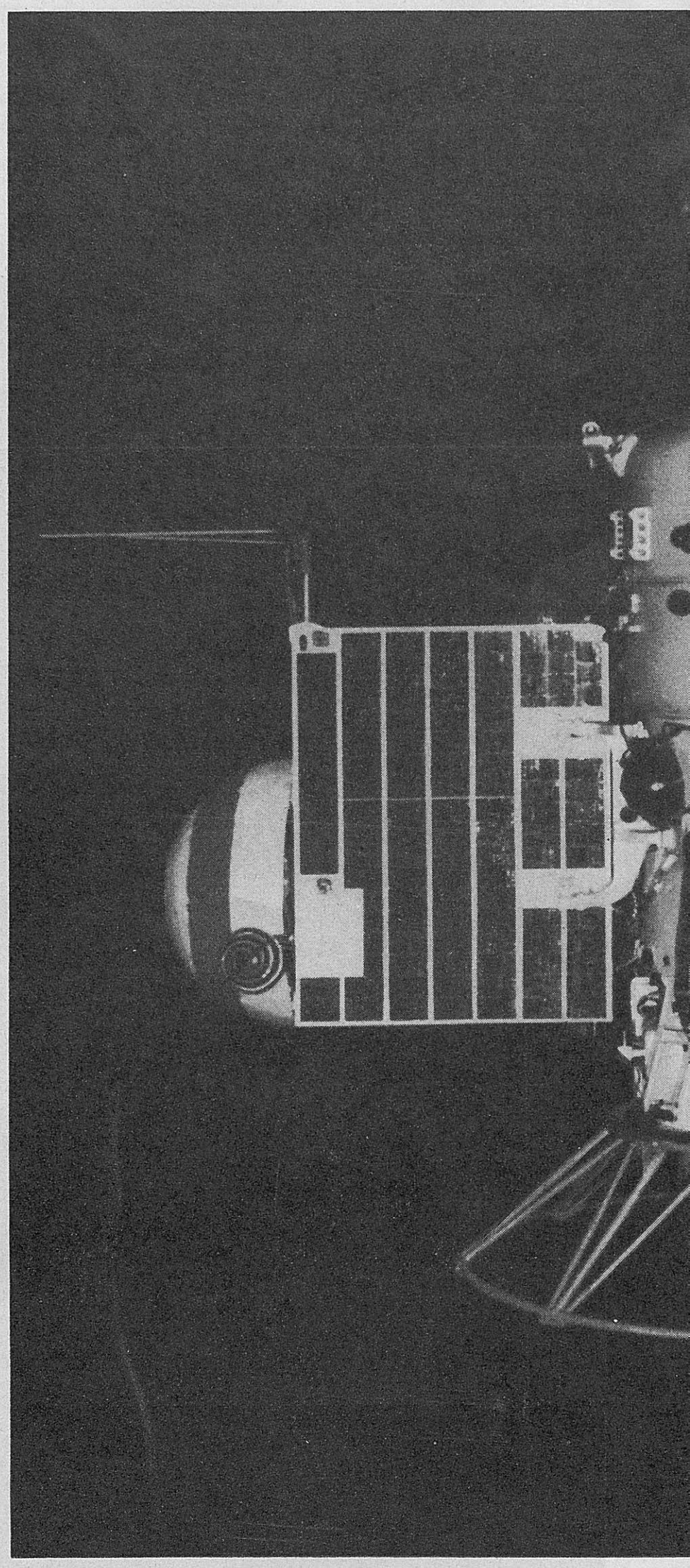
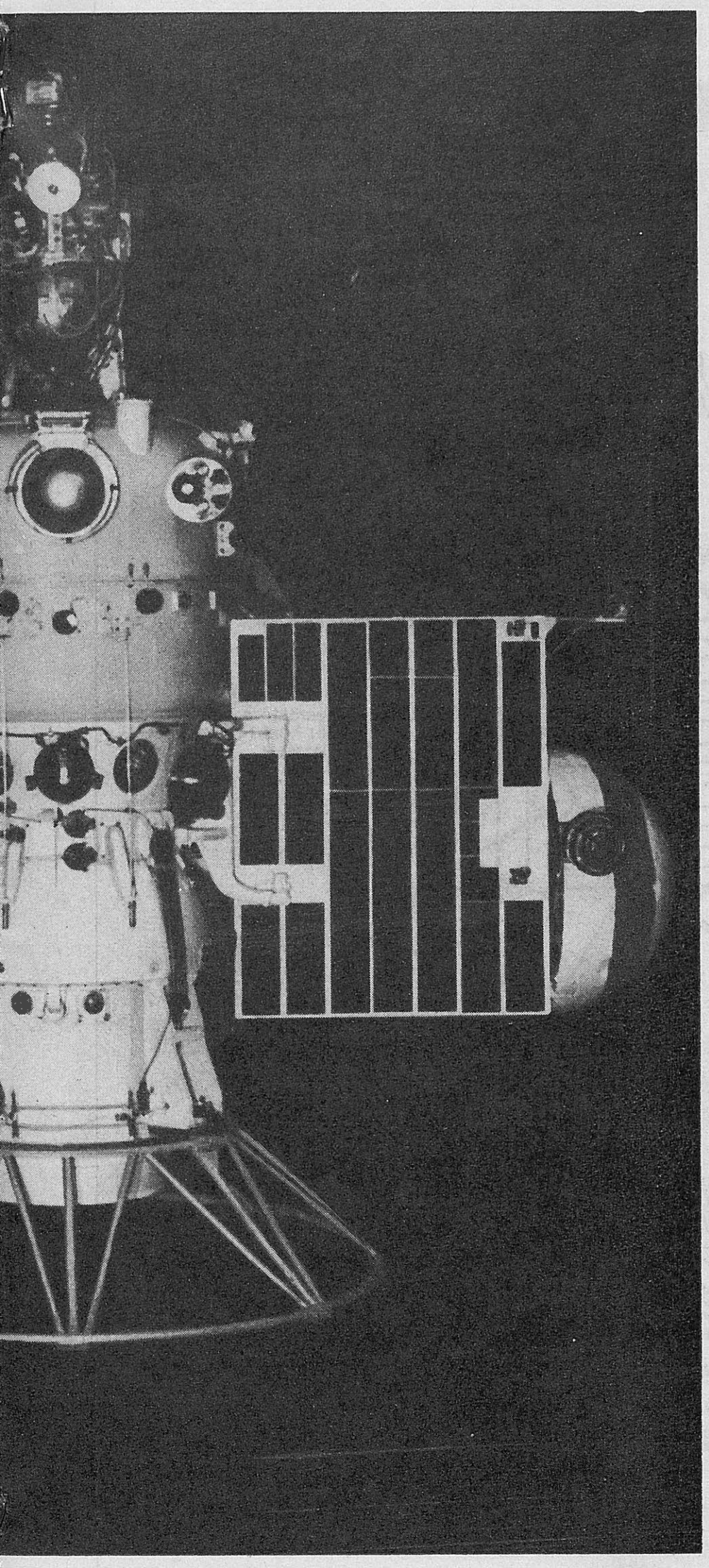


Figure 2. Anoth



iew of the station (Photo: Fotokhronika Tass)

ment: 1.1 m and 4.0 m in width, including solar batteries and radiators. Its weight is 893.5 kgs.

The functioning of all apparatus on board is controlled either automatically or by telecommand from the earth.

In addition to those previously cited, the following scientific instruments are also on board for scientific exploration: a photo-television device, for photographing the surface of Mars; a spectro-reflectometer for research of the organic surface of the planet; a spectrograph for study of ozone absorption lines in the atmosphere of Mars; magnetometers for the detection of its magnetic field and for measuring the magnetic field in space; gas-discharge and scintillation counters for detection of the radiation belts of Mars and the study of spectra of cosmic radiation; counters for the study of nuclear components of the primary cosmic radiation; a radiotelescope for the study of cosmic radiation in the frequency bands around 200 kc/s and 2000 kc/s; special sensors (traps) for registration of the flow of low-velocity protons and electrons, as well as the concentration of positive ions near Mars and in space and sensors for registration of micrometeorites.

Telemetric information received from the automatic station has proved that the system of orientation of the solar batteries is working normally in charging the buffer batteries of the station. The pressure and temperature inside the station are as predicted, namely, 850 mm. Hg and 20-30°C, respectively.

Operation of radiocommunication systems

Three radiocommunication systems are installed in the station, operating on frequencies 183.6 Mc/s, 922.76 Mc/s and in bands 3.7 Gc/s and 6 Gc/s. The sensors which register conditions at the station are connected to the radio transmitter during the periods of communication with the earth. Information from the various scientific instruments is stored and then radioed to earth.

The radio system in the metric band, in parallel with the transmission of telemetric information, serves for communication with the earth in case of faulty functioning of the orientation system.

During the initial stage of the flight, special radiotechnical facilities, spread over various points of the earth, were in operation. Then the long-range space radiocommunication centre began to operate.

Telemetric information is relayed automatically by communication links to the co-ordination-computing centre, where it is processed and analysed with high-speed electronic computers.

Communication periods with the station were carried out both automatically and by telecommand from the earth. The programme of functioning of the systems on board provides for the automatic execution of such periods with intervals between them of two, five and fifteen days. These intervals are necessary to charge the buffer chemical batteries and to provide radio periods at the times of best radio-visibility of the station, which is repeated every day, due to the earth's revolution.

Up to 13 December, 1962, the station operated every second day and subsequently, every fifth day. During the first month after the beginning of the station's flight, 37 radiocommunication periods were carried out, more than 600 telecommands were transmitted and several hundred metres of telemetric tape containing information were received. All equipment, both at the station *Mars-1* and on earth, are functioning normally.

The information received from *Mars-1* is being processed, and will be published in scientific magazines.

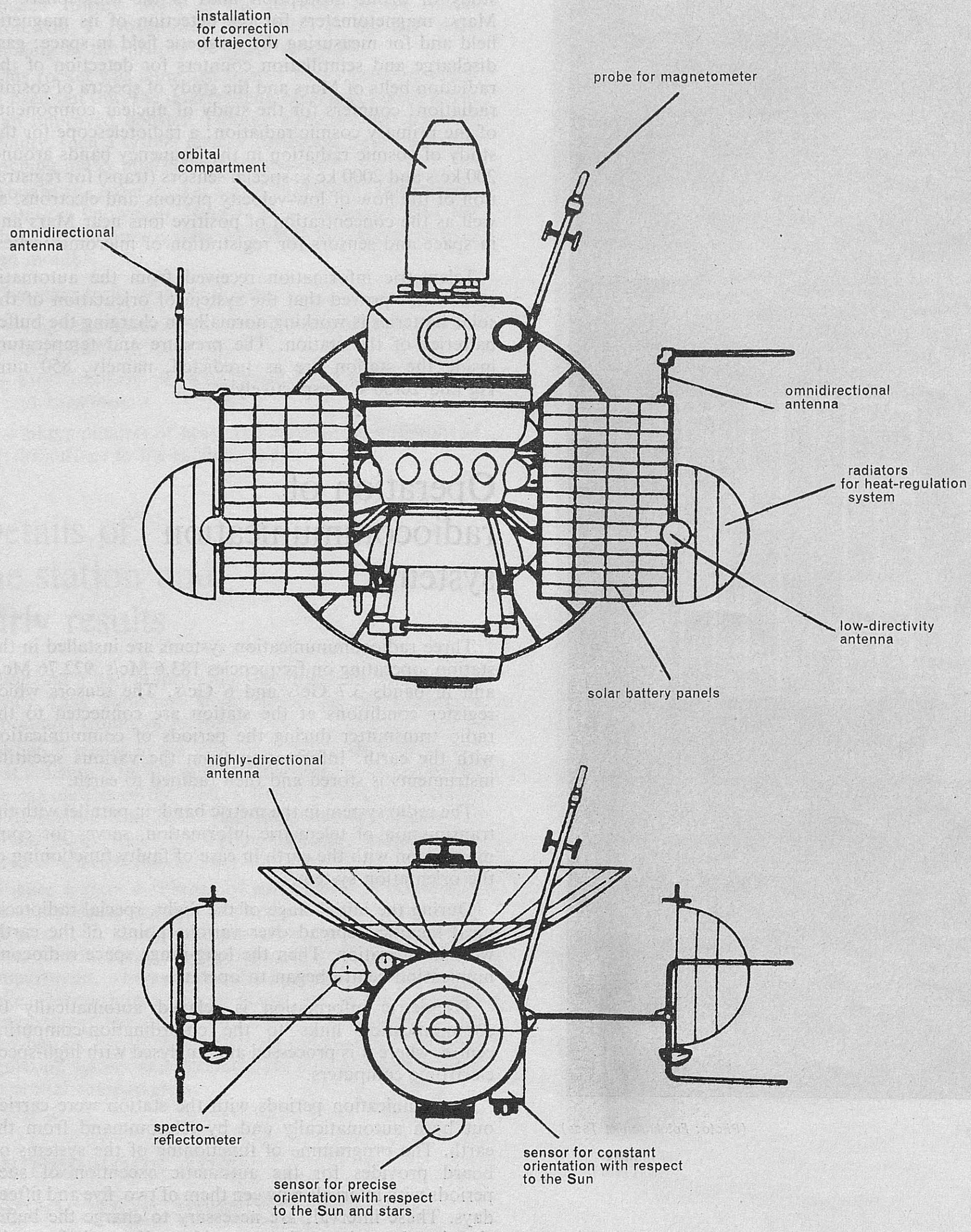


Figure 3. Schema of the station

(Photo: Fotokhronika Tass)

This article deals with a very important problem relating to the standard of satellite telephone communications, which is now under study by the CCITT. It should be noted that the admissible time delay values arrived at in the provisional conclusions of the CCITT Study Group concerned differ considerably from the values mentioned in this article.

the echo control problem in satellite communications

by LARRY C. HUNTER and JAMES A. STEWART

ECHOES ARE PRODUCED in telephone circuits at points in the circuit that can propagate the signal in either direction and where there is an impedance mismatch. Echoes can be heard by the telephone users only if they are delayed significantly during transmission from the speaker to the reflecting point and back to the speaker. Another fundamental requirement is that there be a transmission path for the echo back to the speaker. If early telephone engineers had known that echo would become a problem, they may well have designed the telephone plant with unidirectional transmission paths or so-called 4-wire transmission circuits. The term "4-wire circuit" is commonly used today to describe any circuit in which each speaker has separate and independent transmit and receive paths. A 2-wire circuit is one in which signals are received and transmitted over the same path or pair of wires.

Carrier telephone used for toll transmission provides 4-wire transmission between toll terminals. The drop circuits to the individual customers, however, are 2-wire circuits and the important sources of reflection are the 2-wire hybrids and the individual telephone sets. Because the drops are of various lengths and because they must be switched to set up the desired circuits, it is not possible to precisely match the line and its terminations, consequently reflections occur. The four telephone and the echo paths are illustrated in Figure 1.

The echo problem on telephone circuits was encountered with the introduction of the loading coil which reduced cable attenuation at voice frequencies and permitted cable telephone circuits of 150 to 300 kilometres without amplifiers. Such circuits had a transmission velocity of about 16 000 km per second or a round trip delay of 20 to 40 milliseconds. The application of vacuum tube amplifiers in the 1920's permitted loaded cable circuits to be extended as far as required with the resultant accentuation of the echo problem. This led to the development of echo suppressors.

The first echo suppressors achieved suppression by placing a short circuit across the unused pair of wires in the 4-wire transmission circuit; thus in Figure 2 when A is talking Pair 1 is shorted, and when B is talking Pair 2 is shorted. This method did not permit interruption by the listener. It soon became apparent that to have a natural conversation, means must be provided to permit the listener to interrupt the speaker. As a result the 1A echo suppressor was developed incorporating this feature. This is the echo suppressor presently used by the Bell System on toll circuits having a round trip delay greater than about 45 milliseconds. It is illustrated in Figure 3. A " hybrid " switch is used to open the unused pair to achieve echo suppression. The open switch loss depends on the precision of balance between the balance network and the control amplifier input impedance. In practice about 40 db of loss can be achieved. The closed switch loss depends on the power absorbed in the control amplifier input impedance. The closed switch loss is usually less than 2 db.

Echo suppressors were designed to be placed in the approximate centre of the telephone circuit because in this position the control signals derived from two equal level talker signals are approximately equal. In addition, one set of control circuits can control the two switches. In order to effectively control echoes the suppressor has to have a " hangover " delay greater than the time required for the signal to travel to the farthest reflection point and back to the suppressor, i.e., the suppressor must be held open until all of the echo has been returned and absorbed at or reflected back from the echo suppressor. In more recent times echo suppressors have been applied to submarine cables where it is not feasible to place the suppressor in the centre of the circuit; here a " split " echo suppressor has been used. The split echo suppressor places one switch at each end of the circuit with far-end control for opening the switch and near-end override for interruption. This technique permits the " hangover " delay to be decreased appreciably and thus alleviates, to some extent, the speech chopping, speech clipping and lockout which hangover delay introduces during interruptions. Speech clipping refers to the loss of speech syllables at the beginning of the interrupting speech signal. Speech chopping is the loss of syllables from either speaker's signal when both speakers talk

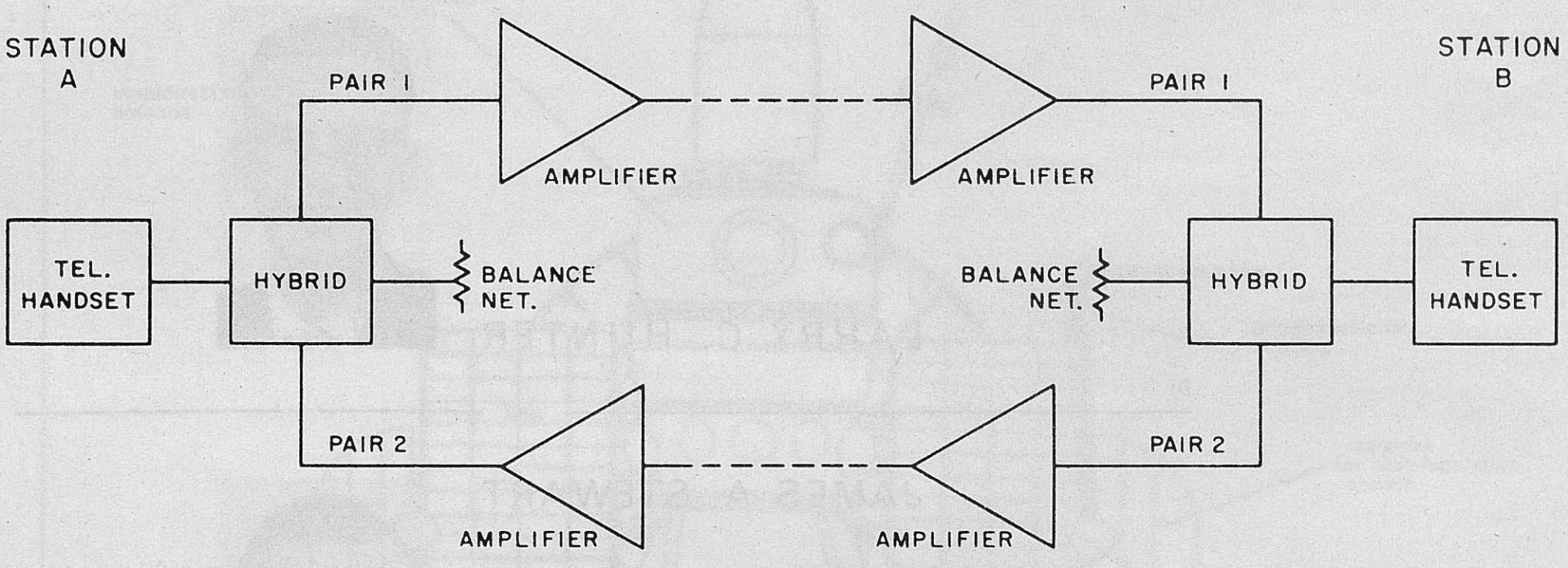


Figure 1 — Echo paths on a 4-wire telephone circuit

simultaneously. It results from transfer of control of the echo suppressor back and forth between the speakers.

Human speech is made up of " talkspurts " having durations of 20 to 400 milliseconds separated by silent periods having durations of 20 to 100 milliseconds (not including pauses between sentences). In addition, different speakers use different " talker volumes "; the range of talker average volume is about ± 12 db. (Peak to average range is $+18$ db to -15 db and total dynamic range exceeded 1% of time $= 18+12+12+15 = 57$ db.) Control signals derived from two talkers can be expected to change in relative magnitude from instant to instant. The presently used echo suppressor compares two control signals; if one is greater than the other for a period exceeding the hangover delay time, the suppressor blocks the side having the weaker signal. Three effects result from this type of control.

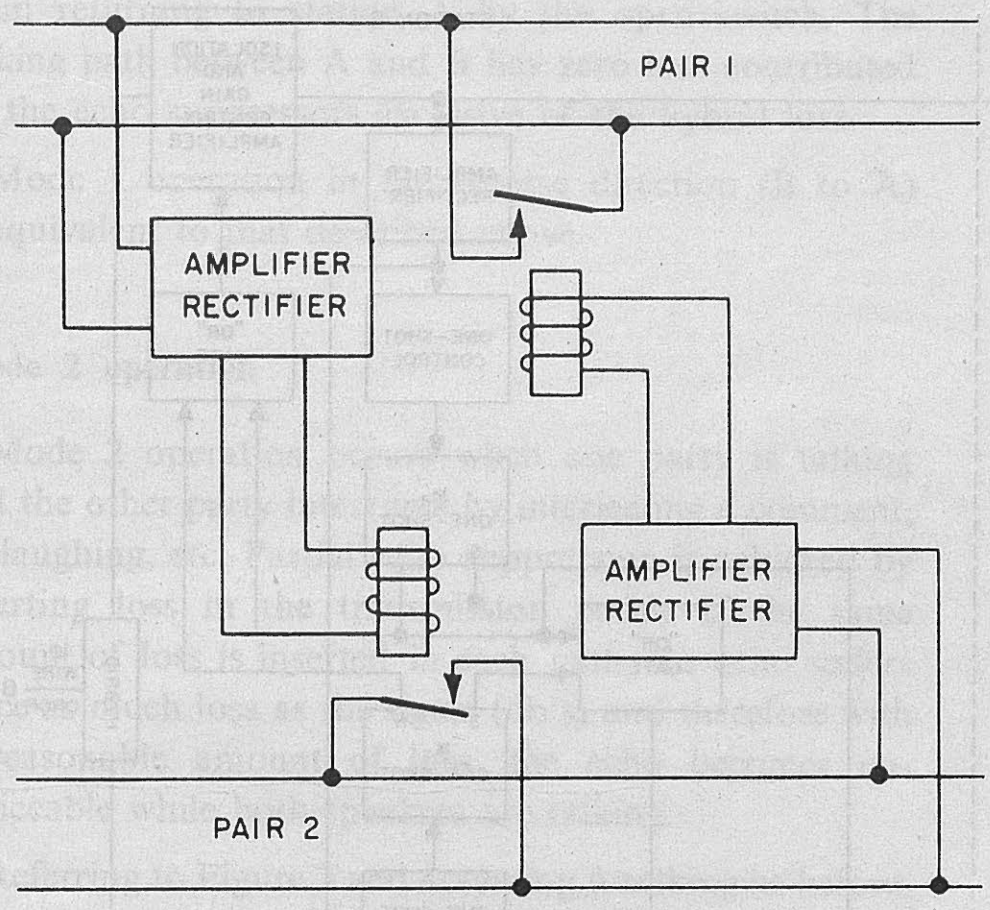


Figure 2

1. " Speech clipping " — Because the interrupting signal must exceed the talker's signal for the hangover period before it can close its transmission path through the echo suppressor, the first syllables are lost. The longer the hangover delay, the greater the effect of speech clipping.

2. " Speech chopping " — Because control transfers back and forth while both parties are talking, it is only necessary that one control signal exceed the other for the hangover period to transfer the switches so that the side that was open is closed and *vice versa*. Once the transfer is made it must stay that way for at least the hangover period. It is easy to see that when two talkers try to talk at the same time pieces of duration greater than or equal to the hangover delay will alternately be " chopped " out of each talker's conversation. This effect is very disconcerting.

3. " Lock-out " — Lock-out occurs only when two or more echo suppressors are connected in tandem. If the two speakers start talking at the same time it is possible that each one will control the suppressor near him and each will talk without the other hearing. The length of the lock-out period depends on the hangover and the nature of the speech. In other words, two suppressors in tandem merely accentuate the " speech chopping " problem. (Lock-out was a much greater problem with early suppressors which short-circuited the path not being used.)

The advent of satellite communications with one-way transmission delays of from 0.1 to 0.3 second has again accented the problem of echo suppression. The General Telephone and Electronics (GT & E) Laboratories, as part of an extensive study of satellite communications systems, investigated present-day echo suppression techniques for use on satellite circuits. The conclusions of these investigations showed that speech chopping and speech clipping during interruptions are the most objectionable design limitations of presently used echo suppressors. It was concluded that

(a) The presence of echo should be detected by means of a reference signal proportional to the amplitude of the signal being reflected with *no* time factor involved. (This minimizes speech clipping.)

(b) The interrupting party should be able to maintain circuit continuity for his speech signal regardless of what the other party does. (This eliminates speech chopping.)

An echo suppressor has been designed by the *Lenkurt Electric Company* to achieve these two objectives. This echo suppressor is illustrated in Figure 4 in block diagram form. It is applied to the voice circuit in a manner similar to the "split echo suppressor," i.e., one unit is normally used at each end of the link. However, there is no restriction on the distance or time delay between the two units. The suppressor unit at station B is identical to the one at station A. Each suppressor unit has two control channels ending in one-shots. These one-shots generate the signals for controlling the switch and the pads. There are two interconnections between the control channels; one provides the variable reference and the other switches between the variable

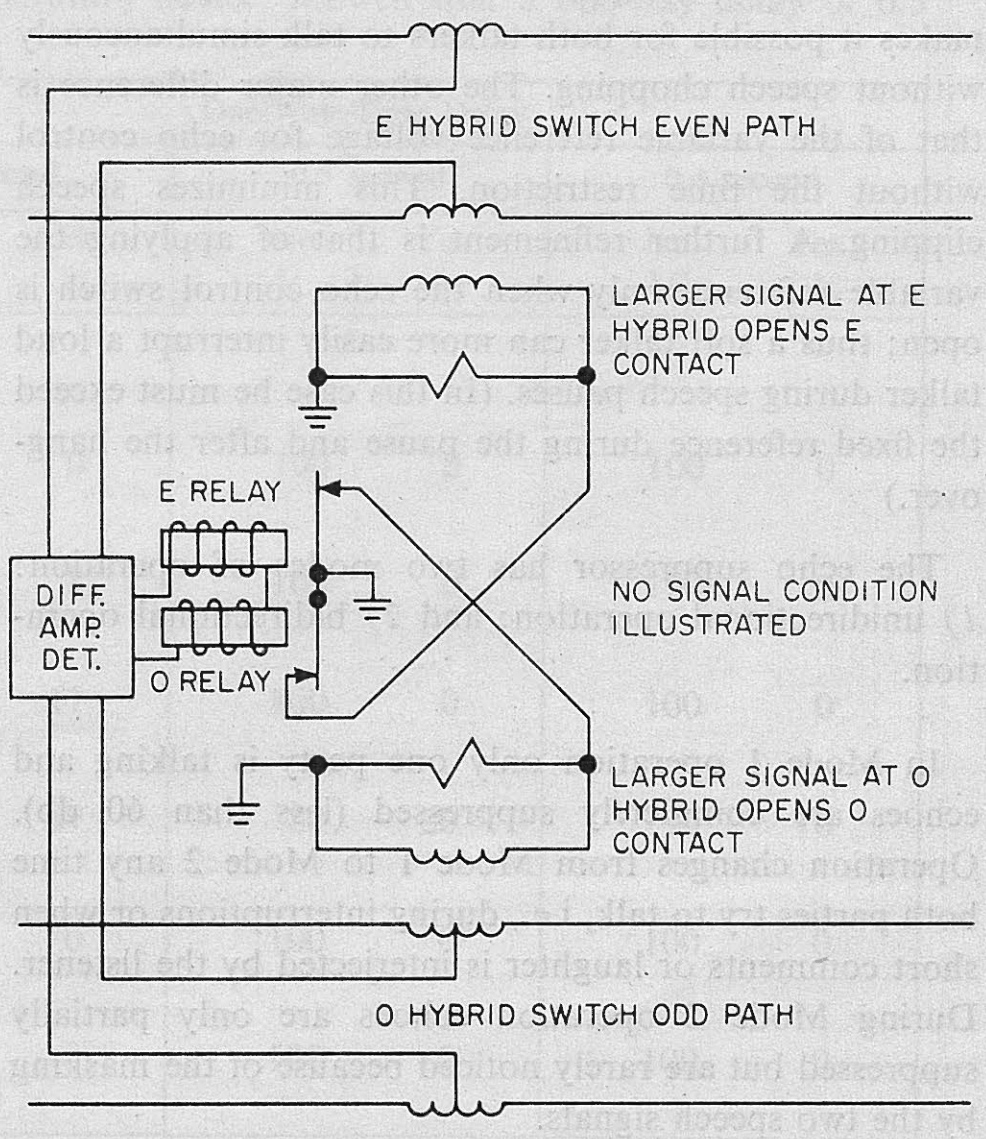


Figure 3

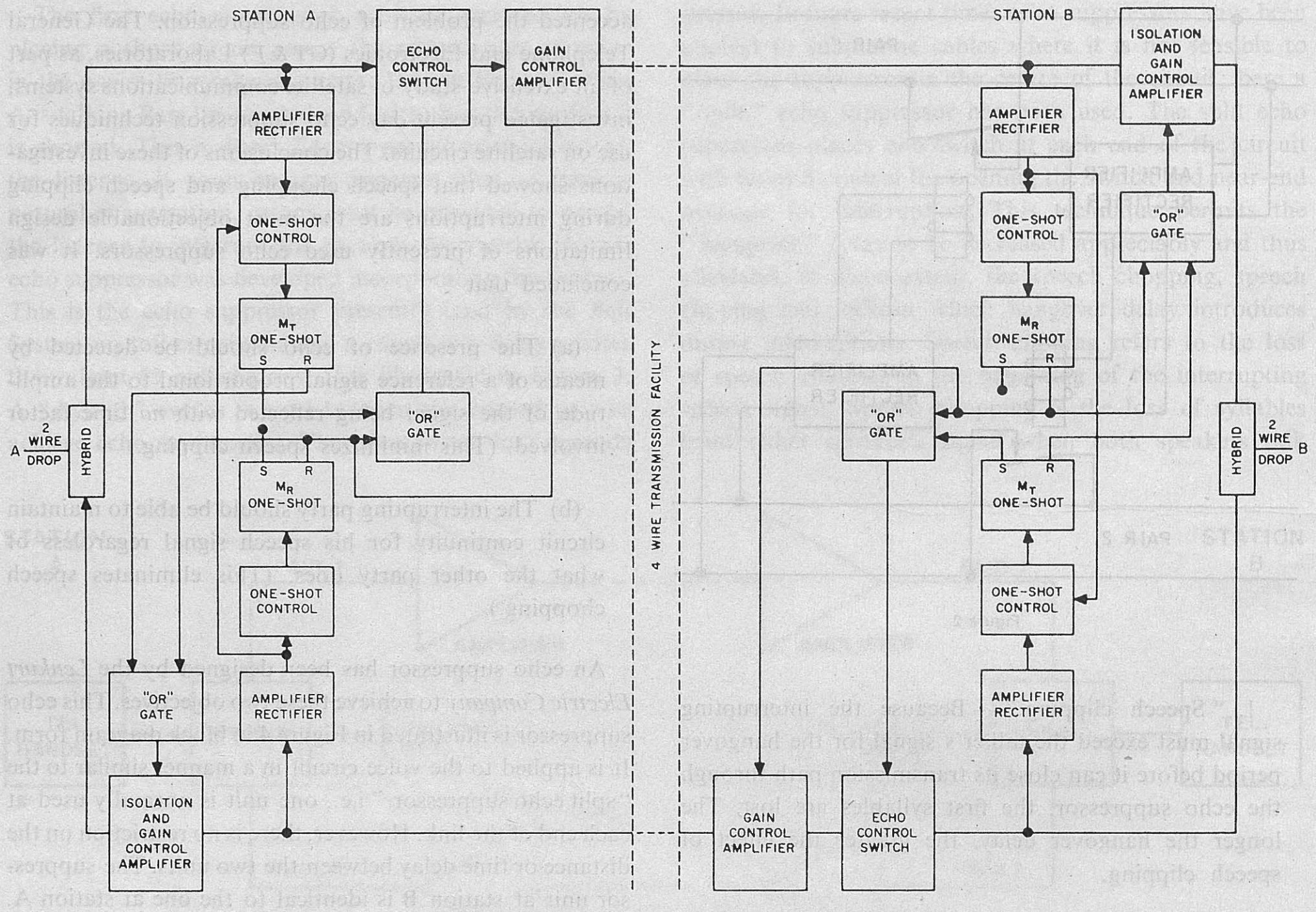


Figure 4

reference and a fixed reference, i.e., when there is no signal to cause an echo a fixed reference is used. A fixed reference is also used when the local talker achieves control of his direction of transmission. This is one major difference between this echo suppressor and the 1A suppressor. It makes it possible for both talkers to talk simultaneously without speech chopping. The other major difference is that of the variable reference voltage for echo control without the time restriction. This minimizes speech clipping. A further refinement is that of applying the variable reference only when the echo control switch is open; thus a soft talker can more easily interrupt a loud talker during speech pauses. (In this case he must exceed the fixed reference during the pause and after the hang-over.)

The echo suppressor has two modes of operation: *1)* unidirectional operation; and *2)* bidirectional operation.

In Mode 1 operation only one party is talking and echoes are completely suppressed (less than 60 db). Operation changes from Mode 1 to Mode 2 any time both parties try to talk, i.e., during interruptions or when short comments or laughter is interjected by the listener. During Mode 2 operation echoes are only partially suppressed but are rarely noticed because of the masking by the two speech signals.

Mode 1 operation

Assume A talking and B listening. A's voice signal is blocked by the isolation amplifier from affecting the lower control chain at station A but is not blocked from the upper control chain. Therefore, at station A M_T will be set and M_R reset. With these output signals the echo control switch is closed and both gain control amplifiers have unity gain.

The received signal at station B acts through the upper control chain to set the one-shot M_R. A portion of the received signal leaks through the hybrid or is reflected from a distant junction in the two-wire drop and would be returned to the talker A if the control switch at B were closed. This leakage signal is also applied to the lower control chain at station B. It could set one-shot M_T if it could overcome the bias applied from the top amplifier rectifier to the lower one-shot control. The reflected signal is always attenuated, but since it may be delayed by as much as 50 milliseconds, the time constants and gains must be adjusted to minimize the possibility of a reflected signal setting M_T. Thus, in Mode 1 operation with A talking, the one-shot states at B are: M_R - set; M_T - reset.

With these states, the echo control switch is open, the lower gain control amplifier has a loss and the upper gain control amplifier has unity gain. The echo is blocked

from returning to station A by the open switch. The talking path between A and B has zero loss contributed by the echo suppressors exclusive of the hybrid loss.

Mode 1 operation in the reverse direction (B to A) is equivalent to that described above.

Mode 2 operation

Mode 2 operation occurs when one party is talking and the other party interrupts by interjecting a comment, by laughing, etc. Partial echo suppression is achieved by inserting loss in the transmission paths. If the same amount of loss is inserted in each path, the echo suffers twice as much loss as the signal (db's) and therefore with a reasonable amount of loss, the echo becomes unnoticeable while both speakers are talking.

Referring to Figure 3 and assuming A talking as before, and: M_T - set, M_R reset at station A; M_R - set, M_T reset at station B. Speaker B starts talking. At station B (assuming B talks loud enough to override the bias) M_T is set. This closes the echo control switch and therefore passes B's signal to A. It is attenuated, however, since the gain control amplifier has a loss with M_R set and with both M_T and M_R set, A's signal is also attenuated by the upper gain control amplifier. At station A, M_R is set by B's signal. Thus at station A, as at station B, both M_T and M_T are set and both gain control amplifiers have losses. Each speech is attenuated by two such losses and each talker echo is attenuated by four such losses. For example, if each loss is 6 db the speech is attenuated 12 db and talker echo is attenuated 24 db in addition to hybrid loss and other losses.

If one talker stops talking, the appropriate one-shots recycle and return the circuit to Mode 1 operation. Recycling time is not critical since the effect is to change circuit attenuation rather than to open or close the circuit.

It is probable that in the future when global communications systems become a reality ground stations will be located so that echo suppressors will be required only at the satellite ground terminals. (Land line extensions will have less than 40 milliseconds round trip delay.) In the meantime, transmission through more than one set of echo suppressors can and will occur. Experience to date, although limited, indicates that lock-out will not be a serious problem with this new type of echo suppressor. This results from the greater ease of interruption and the greater control of the talking path once it is seized.

Echo-time delay experiments

Certainly one of the earliest subjective tests on the time factor in telephone transmission was made by Bell Telephone Laboratories about 1930.[1] Using acoustical delay circuits, the experimentors found it possible to talk fairly conveniently over circuits representing time intervals as great as 0.7 second in each direction. Delays of about one third of this were considered satisfactory in commercial use.

Recently, many organizations have done further experimentation in the time delay problem. The tests at General Telephone and Electronics Laboratories have shown that round trip delays up to one second are not disturbing to natural telephone conversation. The Stanford Research Institute (SRI) recently conducted experiments on a four-wire basis.[2] The table shown below is a summary of the results of their experiments in the absence of voice echo. These experiments, on a strictly laboratory device, showed that a one-way delay of 0.5

Question	One-Way Time Delay					
	1 second		0.5 second		0.4 second	
	No %	Yes %	No %	Yes %	No %	Yes %
1. Does this telephone conversation sound normal to you?	100	0	100	0	100	0
2. Have you had difficulty in carrying on this conversation?	92	8	100	0	100	0
3. Did you notice anything peculiar about the circuit?	83	17	100	0	100	0
4. Did you notice a delay in my replies?	33	67	80	20	90	10
5. Could you detect a time delay in the circuit?	100	0	100	0	100	0
6. Did the delay degrade the usefulness of the circuit?	92	8	100	0	100	0

second was hardly noticeable at the user's telephone with an absence of echo.

As a second phase to this study programme (at SRI) a combined hybrid circuit and echo suppressor, designed and built by General Telephone and Electronics Laboratories, was incorporated into the system. In their report, R. A. Shepherd and R. T. Wolfram state: " Although no quantitative measurements have been made, it can be said that the GT & E device has reduced the echo to a degree where most people using the system cannot hear it. In fact, no subject called has ever volunteered a comment concerning the echo; it was recognized as such only after special instructions and tests, if at all." W. R. Vincent summarized the SRI experiments as follows [3]:

"1. Delays in the region of 0 to 0.4 second do not appear to adversely affect the ability of two people to carry on a conversation. Longer delays have not been studied adequately.

"2. The General Telephone and Electronics echo suppressors permit break-in without loss of hearing by either party at the expense of faint echoes during the interruption period. While the switching can be detected by careful attention to break-in times no loss of conversation has occurred.

"3. Personnel who frequently make long-distance calls have all rated the channel as acceptable.

"4. On local calls rare cases have been noted where two people, well acquainted such as husband and wife team, have realized a hesitation in response. This has been interpreted by those talking as an indication of a distraction at the other's location rather than a circuit delay. This situation has not occurred in sufficient instances to permit analysis or tabulation."

General Telephone and Electronics Laboratories are currently conducting psychological tests of both time delay and echo suppression on actual telephone subscribers. When completed, these experiments will provide the most comprehensive and detailed results on the acceptability by telephone users of delays from 0.1 to 1.0 second.

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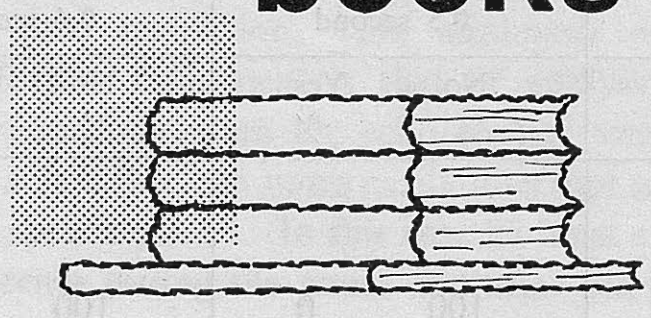

Trägerfrequenz- Nachrichtenübertragung über Hochspannungsleitungen (Carrier frequency news transmission over H. T. circuits), by Heinrich Karl Podszeck. [1]

The 3rd edition meets the need for a fresh orientation arising from the rapid development of technique in the field of high-tension lines and carrier currents. High-voltage lines have, of course, long been used for telephone transmission and other telecommunication installations; for their operation, however, telecommunication networks have become nation-wide. All heavy-current and telecommunication technicians concerned with the perfection of equipment, with the preparation of installation plans and with maintenance will find in this volume a useful account of practical experience with aids to application. Without resorting to mathematical terms, it thoroughly describes the present state of technical progress and outlines future developments, so that business managers, foremen and specialists in related fields will find it a rapid and easy source of reference as well as an interesting document historically.

V. M.

[1] One bound volume; pp. VIII+191, illustrations, tables, diagrams. 24×16 cm. Published by *Springer-Verlag*, Heidelbergerplatz 3, Berlin-Wilmersdorf, 1962. 3rd edition completely revised. Price 36 German marks.

Estructura de la radiodifusión (Organization of broadcasting), by José-Félix Castro. [2]

The report on this question was made with great precision and clarity. All research into the origin, organization and functioning of broadcasting in Colombia will henceforth be facilitated by this study.

V. M.

[2] One volume paper cover; pp. XII+324, illustrations. 22×16 cm. Published by the *Colegio Superior de Publicidad, Periodismo y Radiodifusión*, Carrera 5, N.º 11-28, Bogotá (Republic of Colombia), 1962.

Network analysis and synthesis, by Franklin F. Kuo.[3]

This volume presents a unified treatment of network analysis and synthesis written on a level which is meaningful for all, from the practicing engineer to the undergraduate student of engineering. It emphasizes signal analysis and signal processing and includes a comprehensive coverage of the tools required in linear systems analysis: differential equations, Laplace transforms, convolution, as well as an introduction to complex variables. It presents a chapter on scattering matrices. This subject has never appeared in a textbook before. Finally, it stresses the transfer function-impulse response approach to network analysis. This book is in the realm of required reading for all who are interested, either professionally or academically, in the contemporary approach to the study of network systems.

V. M.

[3] One bound volume; pp. XIV+413, tables, diagrams, formulæ. 23×15 cm. Published by *John Wiley and Sons*, Gordon House, Greencoat Place, London SW 1, 1962. Price 64 sh.

THE JOURNAL

fifty years ago

Telegraph Legislation

Roumania. — The electric telegraph, introduced into Roumania in 1854 during the Crimean War, was declared a public utility only under the 1885 law and was not able to begin its real advance towards progress until after promulgation of the law of 1864 and Roumania's accession to the Paris International Telegraph Convention in 1865.

The 1864 law dealing with the organization of the telegraph service in Roumania was followed by the law of 21 July 1871, then by the law of 5 April 1880, the law of March 1892 and finally the law of March 1900. All these laws concerned themselves with:

1. The telegraph monopoly,

2. Appropriate means of establishing telegraph lines and repression of acts by persons seeking to damage them;

3. Charges and regulation of telegraph correspondence;

4. Secrecy of correspondence, offences, infringements and contraventions which might be committed by means of or at the time of the transmission of telegrams, whether by telegraph agents or by private persons.

. . . . . .

Regarding the telephone service in particular it is noteworthy that the first experiments in telephonic communication were made by the Administration of Posts and Telegraphs in 1884, when a telephone was installed between the Ministry of the Interior and the Posts and Telegraphs building.

. . . . . .

The State reserves the right of monopoly over the telegraph, the telephone and the post. Except if provided with the authorization of the Directorate of Posts and Telegraphs, no person shall be entitled to transmit messages from one place to another or to exchange correspondence of whatsoever kind, either by telegraphic or telephonic machines or appliances or by any other means.

. . . . . .

Although in most cases telegraph and telephone lines extend over roads already open as public thoroughfares, the requirements of their itineraries, either to follow a straight line, or to pass through towns, frequently oblige the State to have recourse to land which is not its property, for the purpose of erecting posts. In such circumstances there must naturally be a clash between local and individual interests.

News

Japan. — His Excellency Baron **Shimpei Goto** has been reappointed Minister of Communications in the place of His Excellency Count Tadasu Hayashi, who has retired; His Excellency **Yuko Hamaguchi** has been appointed Vice-Minister of Communications in place of His Excellency Kengiro Komatsu, who has retired.

Germany. — In our last issue, we mentioned that the Association of Maritime Workers had made arrangements for the compulsory installation of wireless stations on board certain categories of vessels. We understand that no arrangement of this kind has so far been made.

Brazil. — The " Electrical Review " announces that the Brazilian Government has concluded an important contract with Marconi's Wireless Telegraph Company for the erection of powerful wireless stations in Rio de Janeiro, Santa Martha, Bauru and Ladario, the two latter points being towns of importance in the São Paulo and Matto Grosso areas. It is reported that these stations are intended to form the southern centre of the Brazilian internal wireless network first proposed by Dr. Bhering, the Brazilian Government delegate to the recent Wireless Conference in London. At least thirty such stations are said to be necessary to implement the main outline of Dr. Bhering's project. The northern centre of the proposed network is represented by the existing Manaos and Porto Velho stations situated on the river Amazon in the tropics, where there are almost constant violent electric storms.

JOURNAL TÉLÉGRAPHIQUE — February 1913

review

A list of articles in other technical publications which may be of interest to readers of the Journal. The articles are listed under the language of the publication.

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Haut-Parleur (Le). 25, rue Louis-le-Grand, Paris 2e. Année 1962. **No 1058.** P. 48-50. Blocs fonctionnels basse fréquence à transistors pour amplificateurs BF. — P. 67. Code européen pour la désignation des types de tubes et de semi-conducteurs.

Radio-Ref. 60, bd de Bercy, Paris 12e. Année 1962. **No 12.** P. 761-765. *Bastide, J.* L'amplificateur moyenne fréquence. — P. 774-780. *Plion, P.* Redressement et filtrage des tensions d'alimentation. — P. 781-784. L'antenne multibandes Mosley TA33Jr.

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SLAV LANGUAGES

Радио. Москва, 1962. **№ X.** Стр. 6-7. *Семенов А.* Радиосвязь в космосе (Space communications).

On the occasion of the launching into space of the two manned satellites " Vostok 3 " and " Vostok 4," the author describes the radiocommunication systems used during the flights. For long-distance communications, HF transmitters were used at a number of places in the Soviet Union. All the receiving and transmitting stations were connected to the centre of operations. Since HF communications are often subject to ionosphere effects and interference, VHF waves were used for communications at a distance of about 1500 km. When the space vehicle is passing directly over the communication centre, the communication cannot last more than six minutes (the period during which the vehicle is above the radio horizon). For VHF communications, directional antennae are used, their direction being adjusted according to information concerning the vehicle's orbit.

The equipment on board consists of three two-way radiotelephone systems. One of the systems is used for communications between the cosmonauts. The same equipment is used for emergency space-earth communications.

All communications are recorded on tape (automatically controlled by the cosmonaut's voice) on board the space vehicle. The recording can be reproduced at seven times the normal speed and transmitted to Earth by control from the land station.

During rest periods, the cosmonaut can use a broadcasting receiver working on medium and high frequencies.

A suitable radiocommunication system is also placed in the cosmonaut's clothing.

The lip and throat microphones used are designed in such a way that they do not pick up external noises. Communications are possible even at the time of launching the rocket, when the noise of the motors is audible in the cabin.

Various automation equipment facilitates the work of the space pilot. The experience acquired will help in perfecting the equipment for future manned space flights.

M. Joachim

INTERNATIONAL RADIO CONSULTATIVE COMMITTEE (CCIR)

Smoothed monthly sunspot numbers — **1st February 1963**

Predictions for the coming months:

1963	**February**	**24**	**March**	**23**	**April**	**22**
	May	**21**	**June**	**20**		

(Values kindly provided by Prof. Waldmeier, Federal Observatory, Zurich)

official announcements

INTERNATIONAL TELECOMMUNICATION CONVENTION (GENEVA, 1959)

Cuba, Ethiopia, Italy and the **Federal Republic of Germany** ratified the International Telecommunication Convention (Geneva, 1959).

The instruments of ratification were deposited with the General Secretariat of the Union on 12 and 28 December, 1962.

Panama and the **Republic of Rwanda** acceded to the International Telecommunication Convention (Geneva, 1959).

The instruments of accession were deposited with the General Secretariat of the Union on 6 and 12 December, 1962.

RADIO REGULATIONS,
ADDITIONAL RADIO REGULATIONS
(GENEVA REVISION, 1959)

The **Republic of the Congo (Brazzaville), Ethiopia** and **France** approved the Radio Regulations and the Additional Radio Regulations (Geneva, 1959).

INTERNATIONAL RADIO CONSULTATIVE COMMITTEE (CCIR)

The Company **Le Matériel Téléphonique (L.M.T.),** of Boulogne-Billancourt (Seine), asked to participate in the capacity of an industrial organization in the work of the CCIR.

This request was approved by the French Administration.

CONVENTION ON THE PRIVILEGES AND IMMUNITIES OF THE SPECIALIZED AGENCIES

On 20 November, 1962, the **Australian** Government communicated to the Secretary-General of the United Nations its instrument of accession to the Convention on the Privileges and Immunities of the Specialized Agencies among which is the International Telecommunication Union.

Invitations accepted to conferences or meetings external to the Union

Date	Organization	Nature of conference or meeting	Place	Representatives
1963				
29 January-14 February	World Meteorological Organization (WMO)	Working Group on Meteorological Transmissions of Regional Association VI	Paris	Mr. J. BESSEYRE (CCITT) Mr. A. H. CATÁ (IFRB)
4-20 February	United Nations Organization (UNO)	Conference on Science and Technology	Geneva	Mr. Gerald C. GROSS (Secretary-General) Dr. M. B. SARWATE (General Secretariat) Mr. J. H. GAYER, Mr. M. N. MIRZA, Mr. S. HASE, Mr. J. ZIÓLKOWSKI (IFRB) Dr. E. METZLER, Mr. L. W. HAYES (CCIR) Mr. J. ROUVIÈRE (CCITT)
1-27 April	World Meteorological Organization (WMO)	Fourth Session of the World Meteorological Congress	Geneva	Mr. A. H. CATÁ (IFRB) Mr. J. PERSIN (General Secretariat) Mr. M. JOACHIM (CCIR)
6 April		Third Session of the Regional Association for North and Central America	Geneva	
12 April		Third Session of the Regional Association for South America	Geneva	

Calendar of ITU conferences and meetings

Date	Title	Place
1963	**International Radio Consultative Committee (CCIR):**	
16 January-15 February	Xth Plenary Assembly	Geneva
	International Telegraph and Telephone Consultative Committee (CCITT) and **International Radio Consultative Committee (CCIR):**	
5-14 February	Plan Sub-Committee for Asia	Geneva
20-31 May	Plan Sub-Committee for Latin America and RIT Committee (Inter-American Telecommunication Network)	Bogotá
End of November and beginning of December	Plan Committee	Rome
	International Frequency Registration Board (IFRB):	
	Seminars on frequency management and the use of the radio frequency spectrum:	
25 February-8 March	Seminar in English	Geneva
25 March-5 April	Seminar in French	Geneva
22 April-3 May	Seminar in Spanish	Geneva
	International Telegraph and Telephone Consultative Committee (CCITT):	
25 February-1 March	Working Party of Study Group III (Drafting of the Recommendations on lease of circuits)	Geneva
26 february-12 March	Working Party of Study Group VII (Definitions) and Study Group VII (Means of expression)	Geneva
28 March-10 April	Working Party of Study Group XI (National automatic networks)	Geneva
16-29 April	Working Party of Study Group XI (Intercontinental signalling)	The Hague
22-27 April	Working Party of Study Group VI (Drafting of Recommendations)	Brussels
May or June (5 days)	Study Group XII (Telephone transmission performance)	Prague
6-14 May	Working Party of Study Group IV (Variation of equivalent)	Geneva
May	Working Party of Study Groups I, VIII and Special A, on " Telegraph Alphabet "	Geneva
May	Working Party of Study Groups I, VIII and X on " Retransmission of messages "	Geneva
May	Working Party of Study Groups I and X on " World-wide telex plan "	Geneva
May	Study Group X (Telegraph switching)	Geneva
27 May-1 June	Working Party of Study Group IV (Automatic measuring)	Stockholm
June	Study Group VIII (Telegraph apparatus)	Geneva
June	Study Group IX (Telegraph transmission)	Geneva
June	Study Group XIV (Facsimile)	Geneva
24-28 June	Study Group XVI (Telephone circuits)	Geneva
July ?	Working Party of Study Group XIII (Statistics on quality of service)	—
18 September-15 October	Working Parties of Study Group IV, and Study Group IV (Maintenance)	Geneva
23 September-5 October	Special Study Group A (Data transmission)	Geneva
7-25 October	Study Group XI (Telephone switching)	Melbourne
	Study Group XIII (Automatic networks)	Melbourne
	Special Study Group B (Intercontinental automatic network)	Melbourne
November	Study Group V (Protection)	Geneva
	Working Parties of Study Groups V and VI, and V and XV	Geneva
	Working Parties of Study Group XV (Transmission systems)	Geneva
	Working Party of Study Group XII (Laboratory)	Geneva
23 March-26 April	**ITU Administrative Council** (18th Session)	Geneva
29 April-End of May	**African VHF/UHF Broadcasting Conference**	Geneva
4-24 June	**Second Session of the Panel of Experts to consider measures to reduce congestion in the frequency bands between 4 and 27.5 Mc/s**	Geneva
7 October	**Extraordinary Administrative Radio Conference on Space Communications**	Geneva

List of recent and forthcoming publications of the International Telecommunication Union

The following letters indicate the languages in which documents are published:

F *for French* **S** *for Spanish*
E *for English* **R** *for Russian*
C *for Chinese*
Prices are in Swiss francs

Note

A comprehensive list of all the publications of the Union will be supplied free on request.

I. Publications issued since the last number of the Journal

Summary of Monitoring information received by the IFRB.
No, 77 (October, 1962).
Trilingual edition **F, E, S.**

General telegraph statistics, 1961.
Trilingual edition **F, E, S.**
Price: 13.50 Sw. fr.

{ **List of international telex circuits,** 31 December 1961.
{ **Table of international telex routes,** 31 December 1961.
Trilingual edition **F, E, S.**
Price for the two (inseparable) publications: 9.25 Sw. fr.

Tentative high frequency broadcasting schedule (M, 1963)
Period: 3 March-5 May, 1963
Trilingual edition **F, E, S.**

High frequency broadcasting schedule (M, 1962)
Period: 4 March-6 May, 1962
Trilingual edition **F, E, S.**

International Frequency Registration Board (IFRB) :

Preparatory correspondence course for participants and Reference manual for use in Seminars on frequency management and use of the radio frequency spectrum, organized by the IFRB
Editions in separate languages **F, E, S.**

International Telegraph and Telephone Consultative Committee (CCITT):

IInd Plenary Assembly, New Delhi, 16 December, 1960.
Red Book.
Vol. IV
(Tomo IV. Mantenencia. 1.ª Parte : Recomendaciones (Series M y N) 2.ª Parte : Cuestiones. 3.ª Parte : Suplementos a las Consignas de mantenencia).
Spanish edition.
Price:

II. Forthcoming publications

Summary of Monitoring information received by the IFRB.
No. 78 (November, 1962)
Trilingual edition **F, E, S.**

High frequency broadcasting schedules
(4 publications per annum).
Trilingual edition **F, E, S.**

Alphabetical List of call signs, 1st edition (List VII.B).
Multilingual edition **F, E, S, R, C.**

List of international telephone routes, 3rd edition, 1st January, 1963.
Trilingual edition **F, E, S.**

List of ship stations, 3rd edition.
Trilingual edition, **F, E, S.**

List of radiodetermination and special service stations, 2nd edition, 31 March, 1963.
Editions in separate languages **F, E** (possibly **S, R, C**).

International Radio Consultative Committee (CCIR) :

IXth Plenary Assembly, Los Angeles, 1959.
Addendum No. 3 to the volumes I, II and III.
Spanish edition.

International Frequency Registration Board (IFRB) :

International Frequency List, 2nd edition, 1st February, 1963
Preface in separate editions **F, E, S.**
Vol. I — Particulars of frequency assignments between 10 and 4995 kc/s.
Vol. II — 4995 and 9995 kc/s.
Vol. III — 9995-28 000 kc/s.
Vol. IV — Frequencies above 28 Mc/s.

List of low power broadcasting stations in frequency bands 41-230 Mc/s
Trilingual edition **F, E, S.**

International Telegraph and Telephone Consultative Committee. (CCITT) :

Directives.
Editions in separate languages **F, E, S.**
II Plenary Assembly, New Delhi, 1960.
Red Book.
Vols. VI and VII. **Spanish** edition.
Vol. V. Editions in separate languages **F, E, S.**

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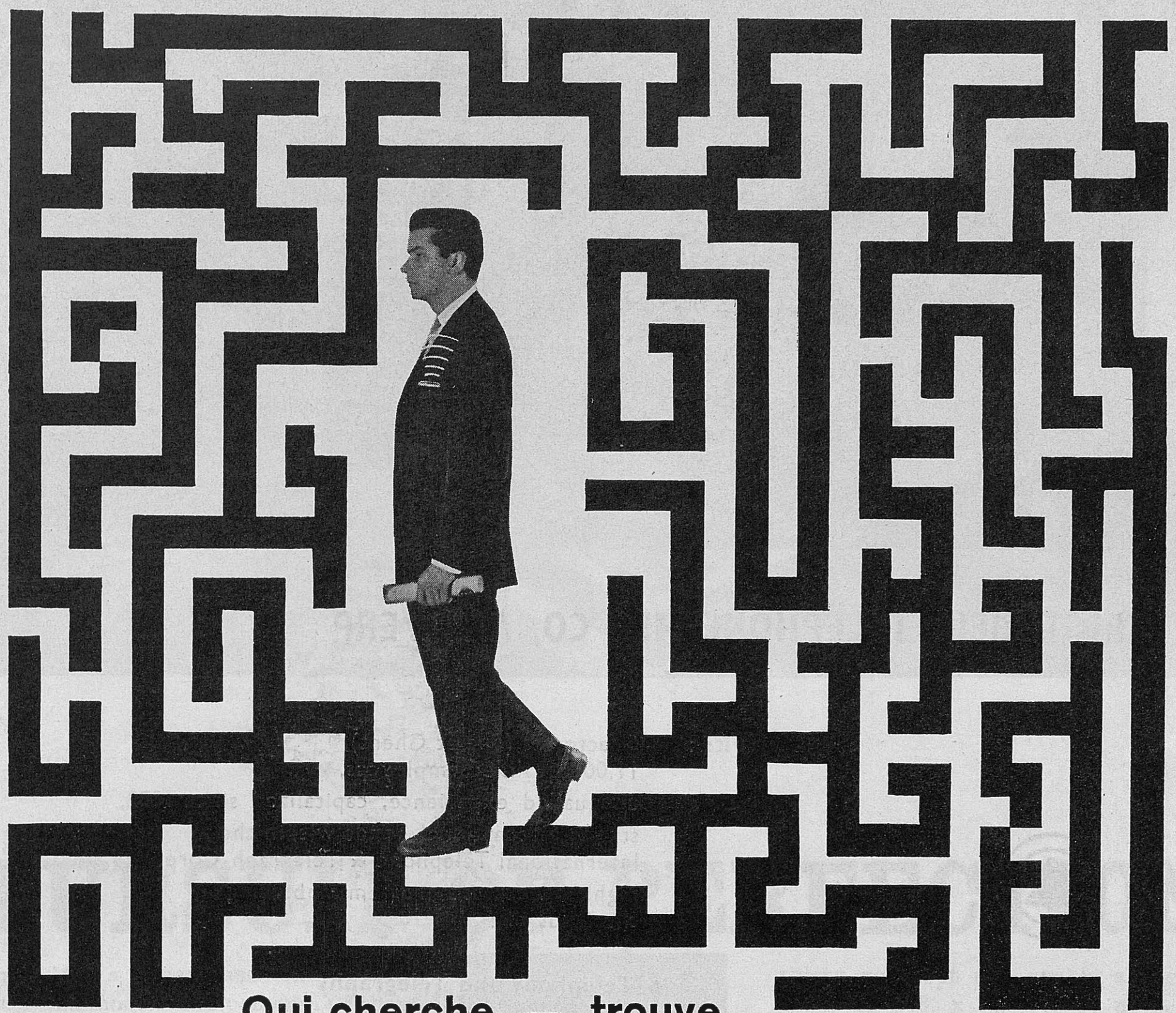

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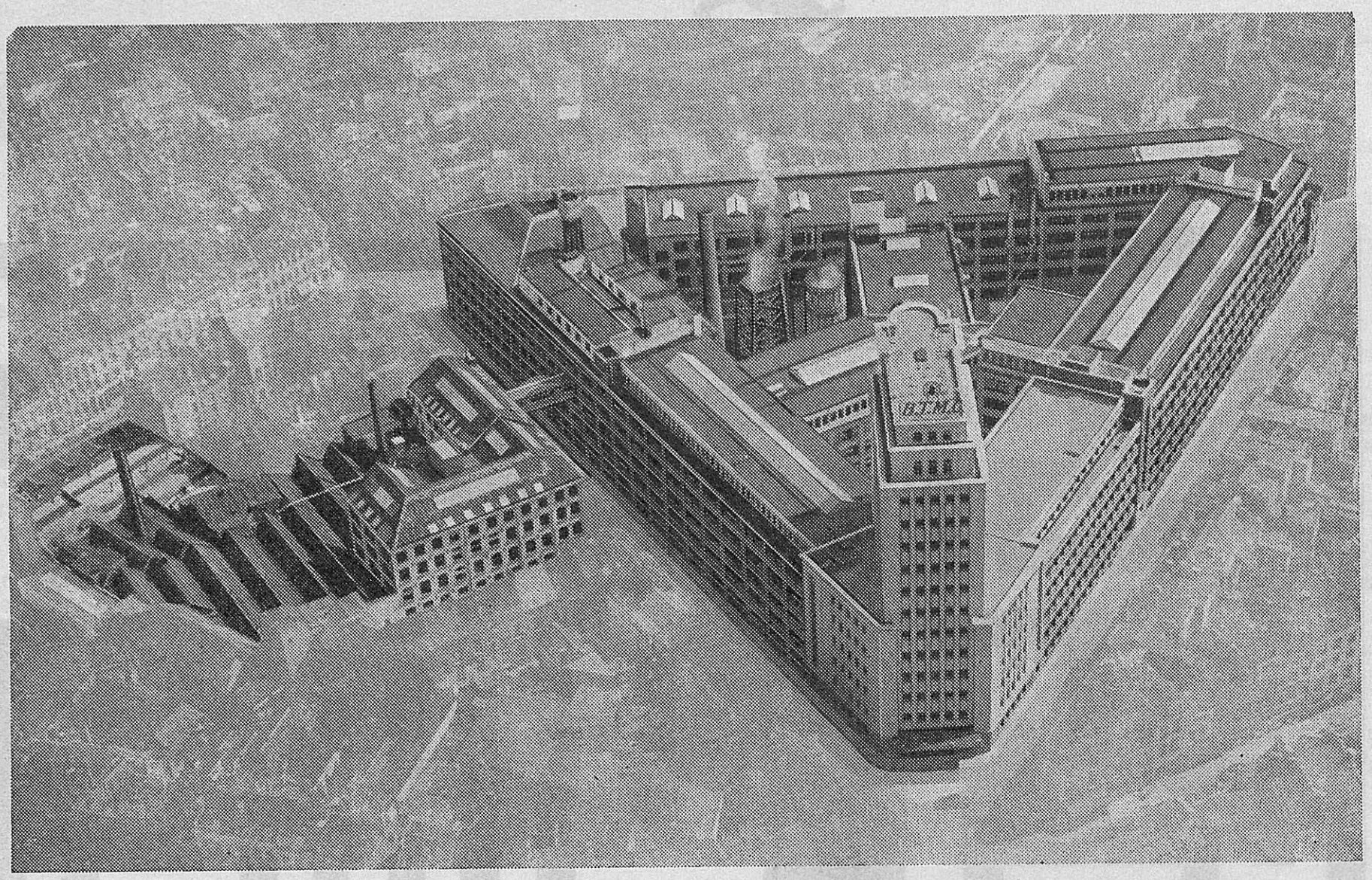

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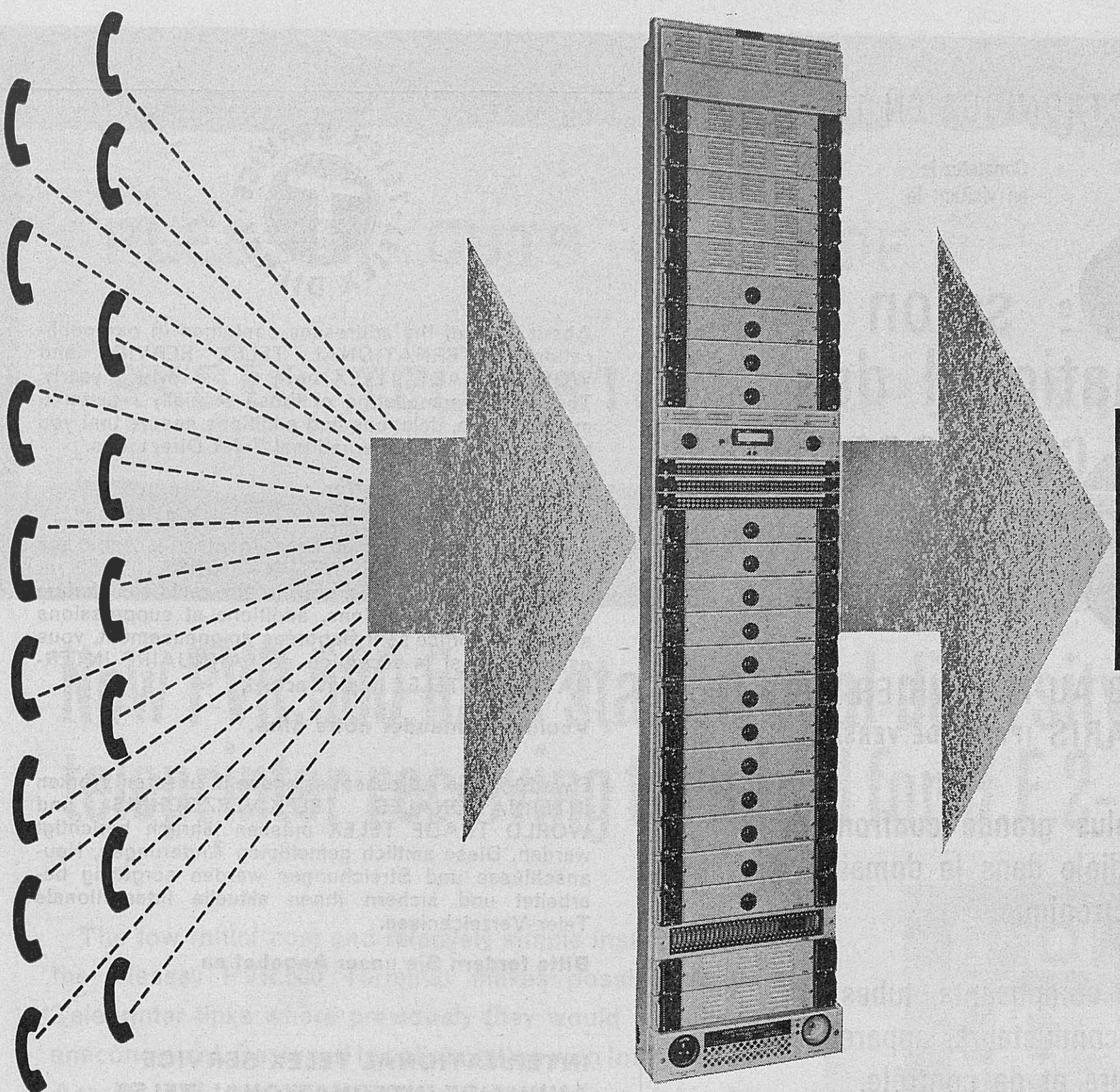

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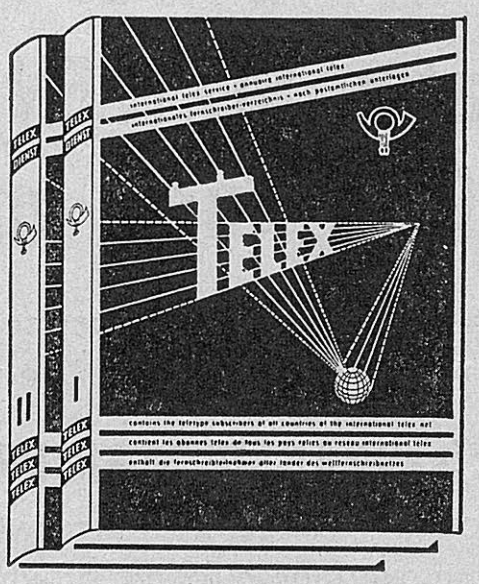

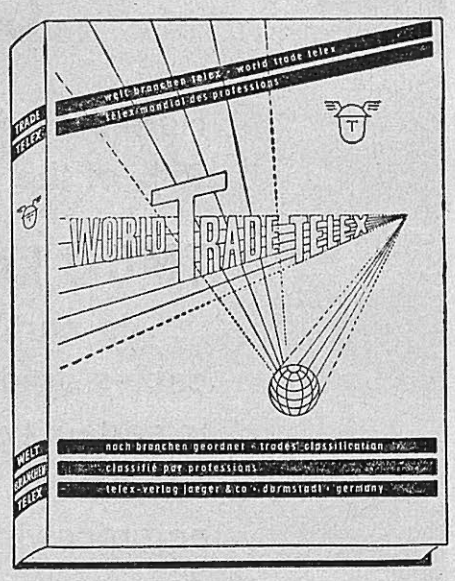

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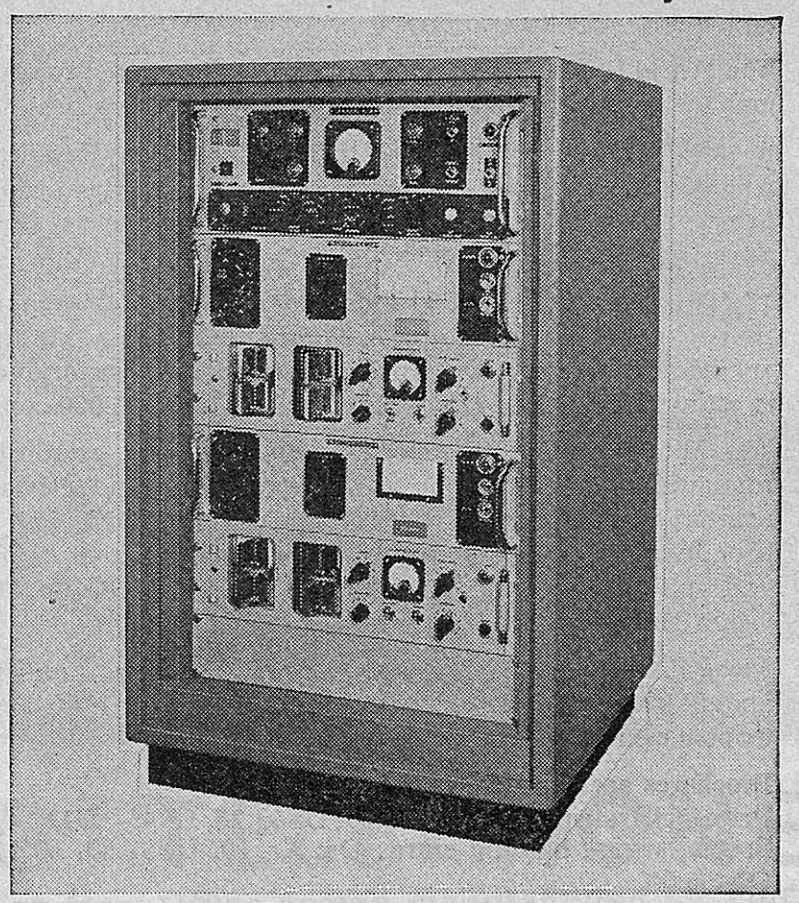

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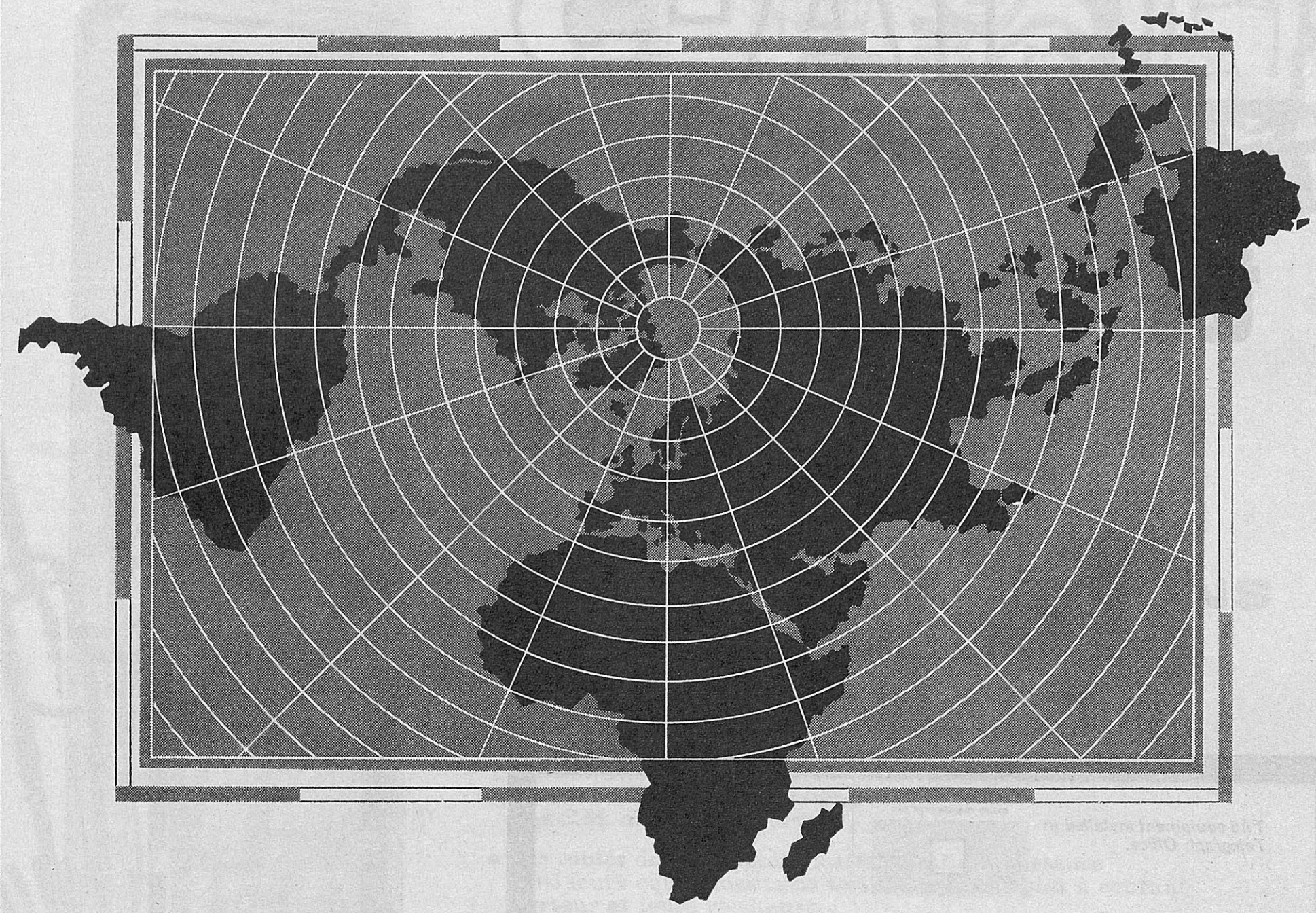

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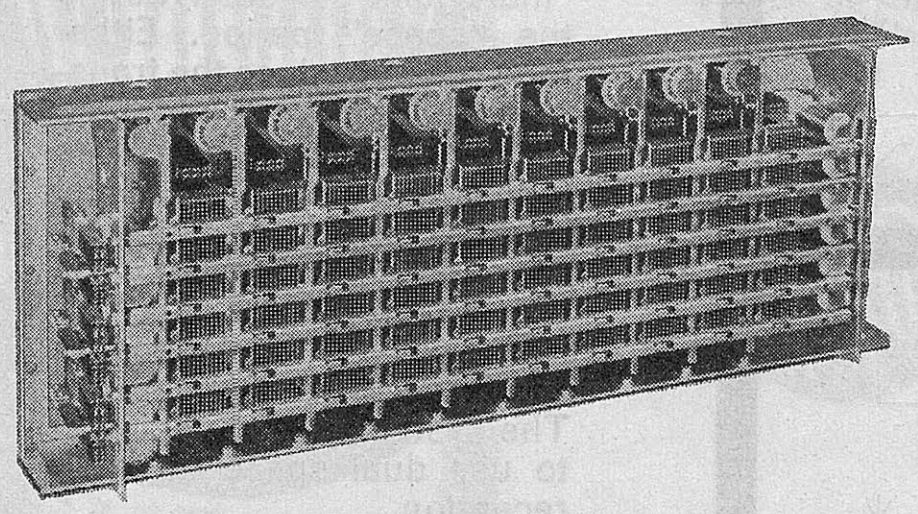

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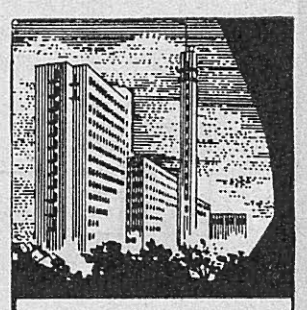

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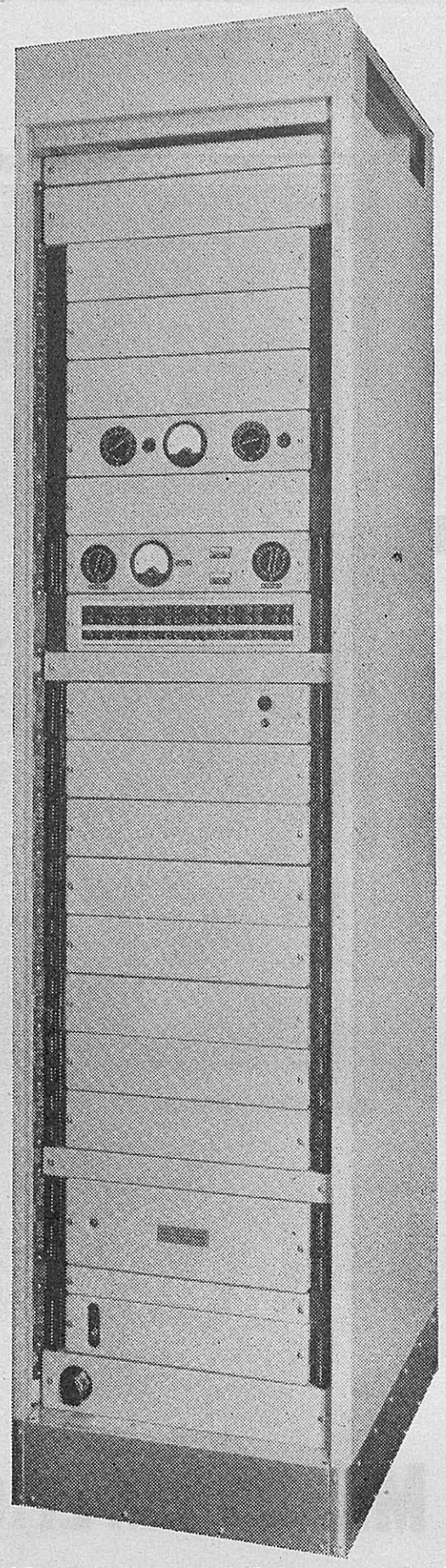

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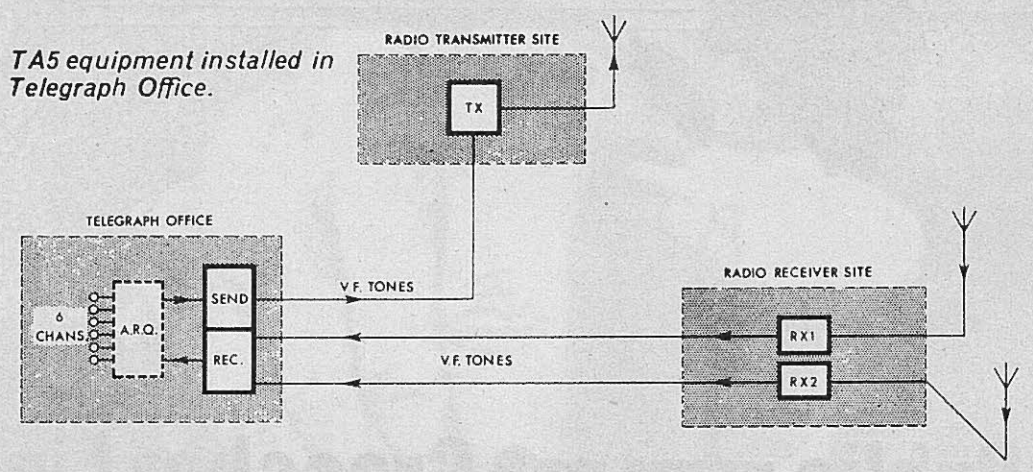

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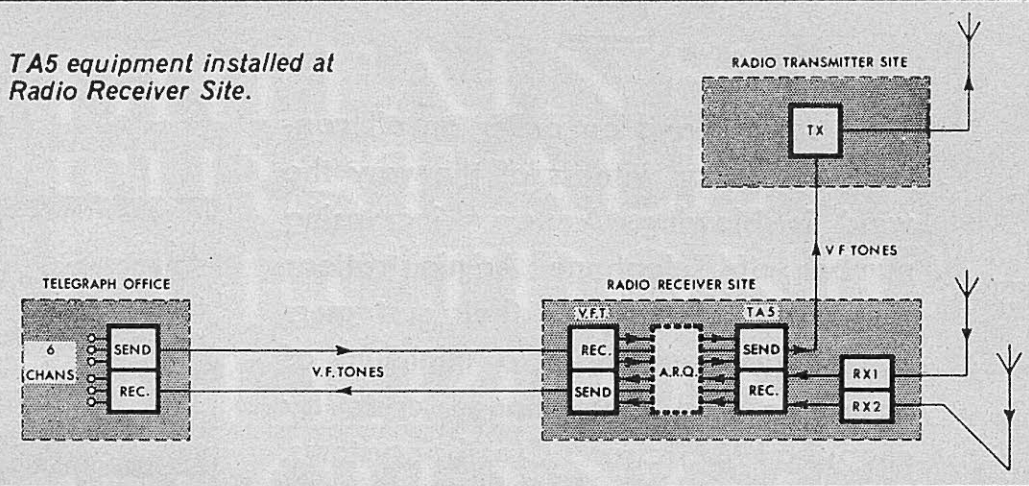
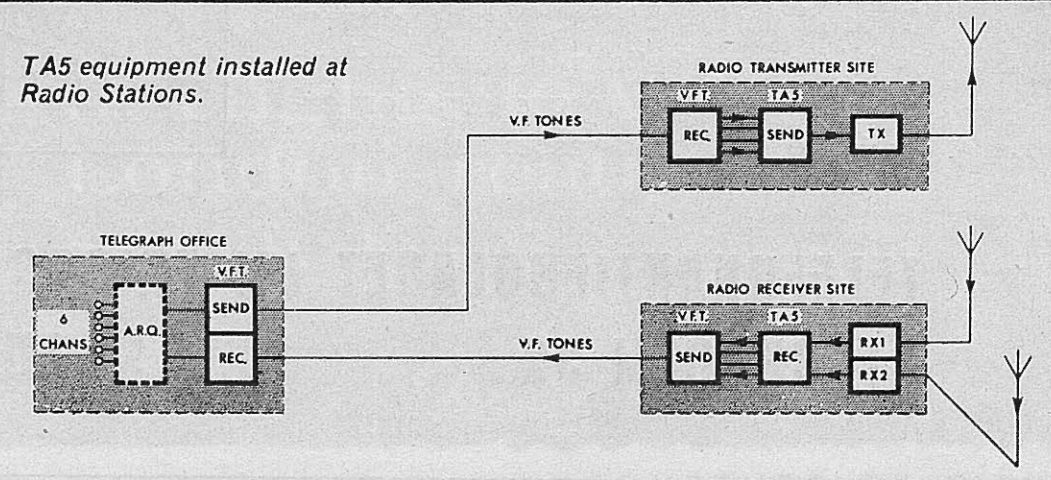


TA5 equipment installed at Radio Stations.



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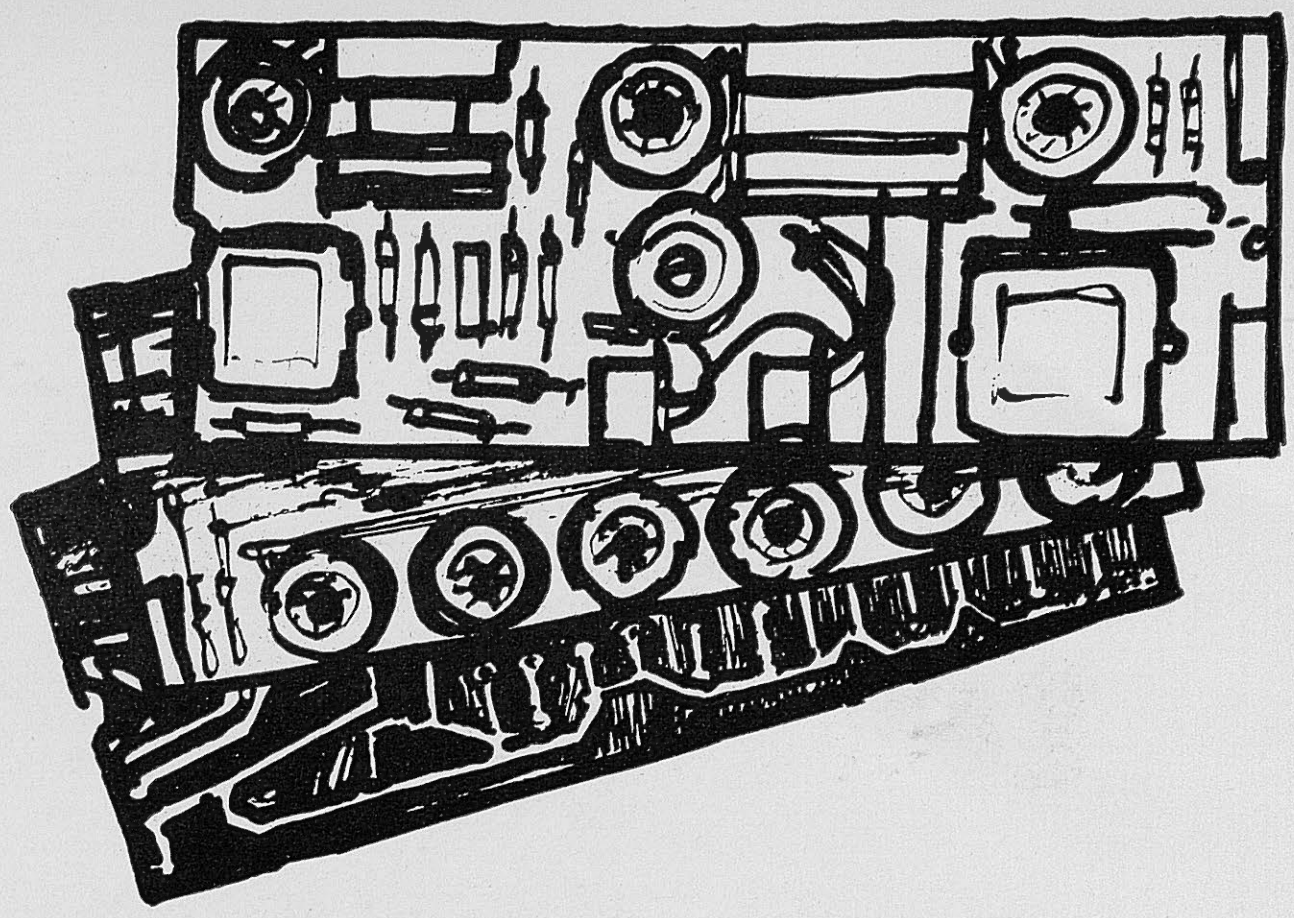

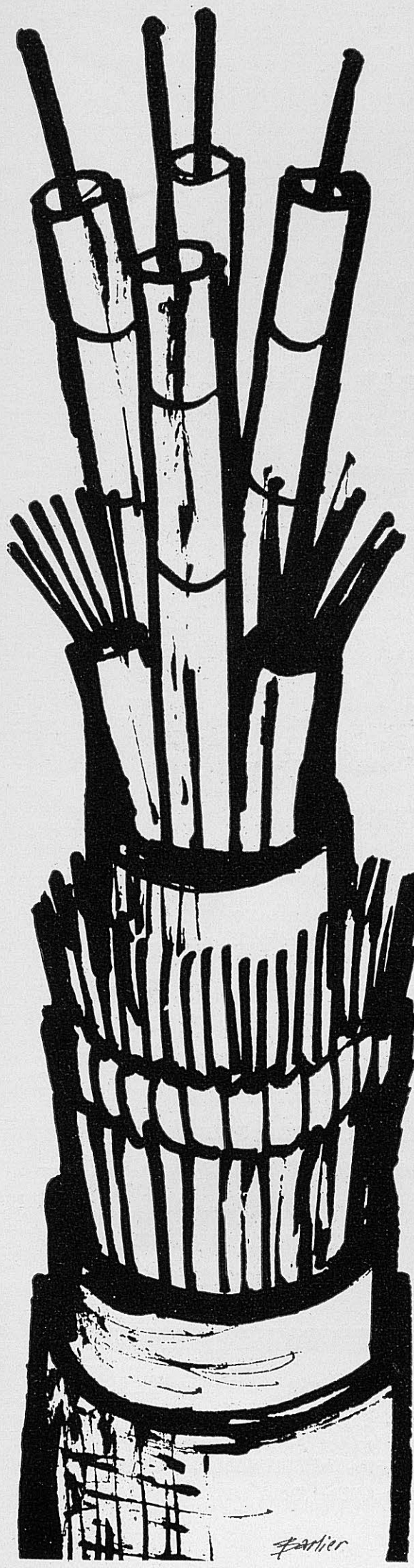

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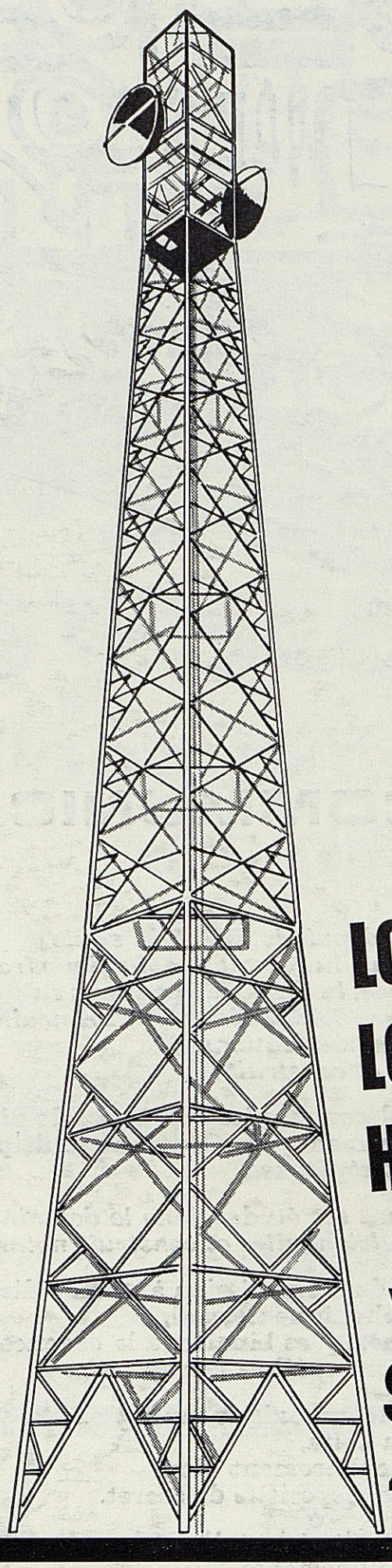
télécommunications
électronique

69 RUE DE MONCEAU PARIS 8e

impact



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LOW INSTALLATION COSTS
HIGH PERFORMANCE

with the new
STC
4 Gc/s system

The RL4G high performance 960-circuit telephony/TV system is a development based on STC's wide experience with 4 Gc/s systems in both hemispheres of the world. The many new features of the system will commend it to all those interested in the installation of national and international telecommunications networks.

Terminal transmitter and receiver mount in one cubicle. Permanent magnet focused TWA with 38 dB gain gives approx. 5W transmitter output. Natural cooling eliminates air blowers. Crystal local oscillator with multiplier reduces power and valve costs. Single TWT is only microwave valve in terminal or repeater. Direct i.f. modulator improves performance and reduces running costs. Compact baseband switching system using transistor circuits provides up to 5 + 1 protection channel operation.

A full range of ancillary equipment is available, including remote supervisory and control systems.

STC provide an overall service from route planning and site survey to installation and maintenance.

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